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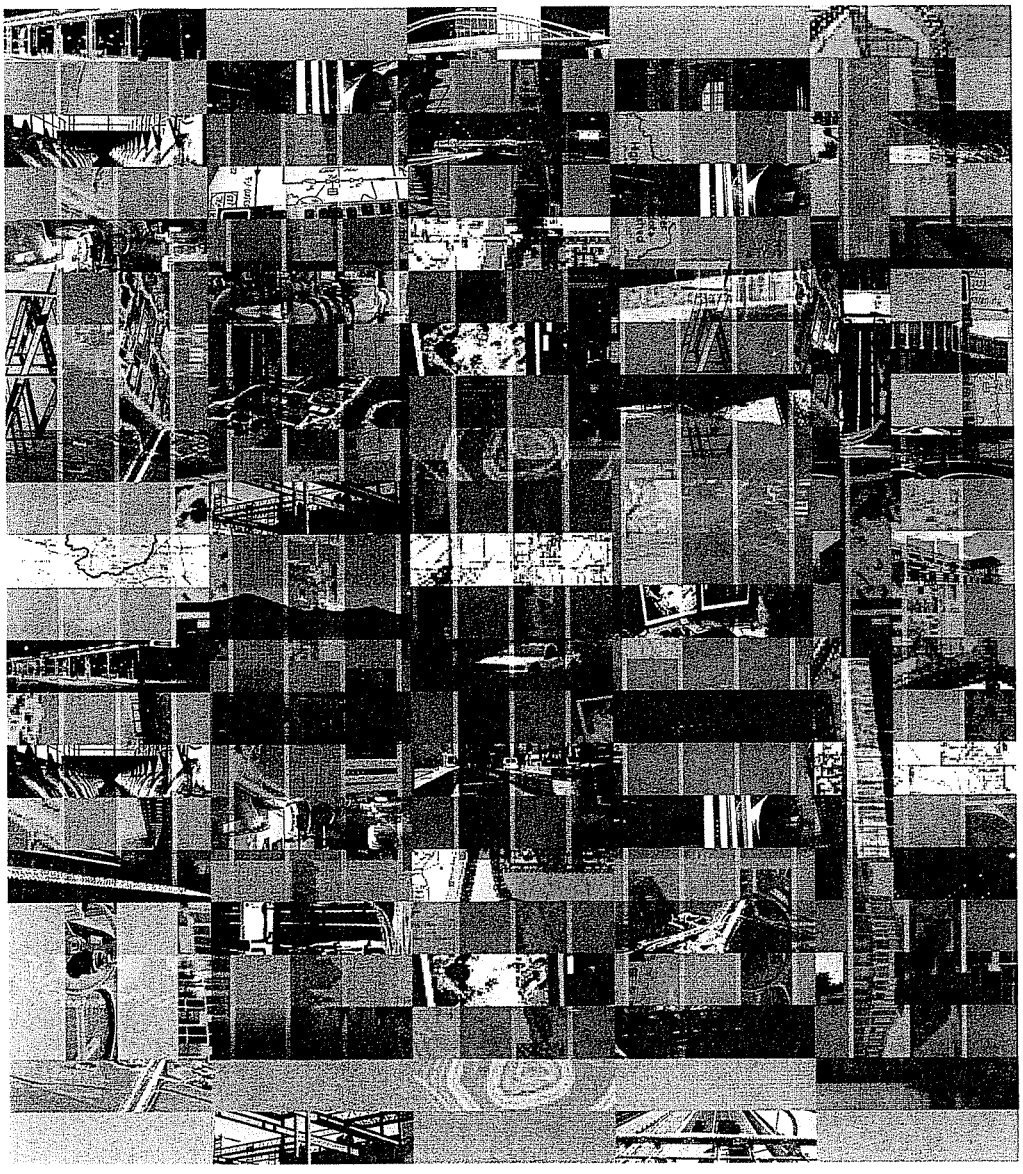

Report

Carrollton Utilities, KY

July 2012

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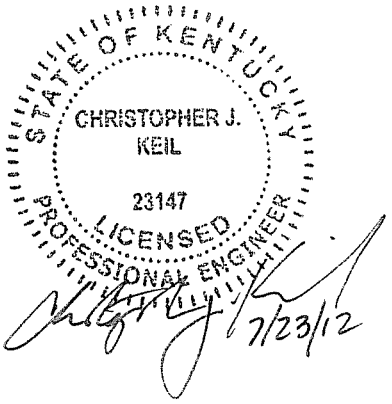
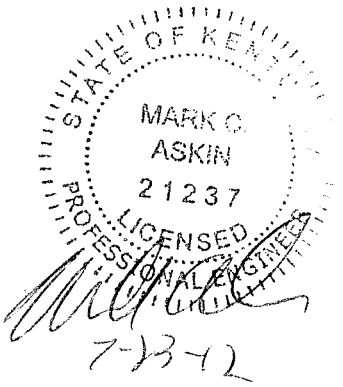
Report for

Carrollton Utilities, Kentucky

Countywide Underserved Project
Preliminary Engineering Report (PER)





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July 2012

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PURPOSE AND SCOPE

The purpose of this preliminary engineering report (PER) is to discuss the necessary design elements for the proposed improvements at the Carrollton Utilities (CU) Water Treatment Plant (WTP) and throughout the West Carroll Water District (WCWD) distribution system. CU's primary objectives of the project are:

1. To reduce the operational requirements at the WTP to one manned shift a day so that these resources can be utilized elsewhere in the system.

2. To address the reduction in available sludge lagoon volume because of revised land use.

3. To extend potable water service to new customers and improve service to existing customers within the WCWD service area.

4. To increase treatment redundancy to accommodate equipment maintenance.

This report addresses the requirements, as described in the Kentucky Administrative Regulations Requirement Chapter 8:100, for the preliminary design approval before final design commences.

Using existing data, CU and WCWD input, and our water treatment and distribution experience, the PER identifies the issues and applicable technologies proposed to meet the goals of CU, WCWD, and the Safe Drinking Water Act (SDWA). This report encompasses the evaluated alternatives, considers the utilities' objectives, and presents the recommended solutions that were ultimately selected by CU and WCWD.

The PER will first address the WTP characteristics and improvements, followed by the distribution system portion of the project.

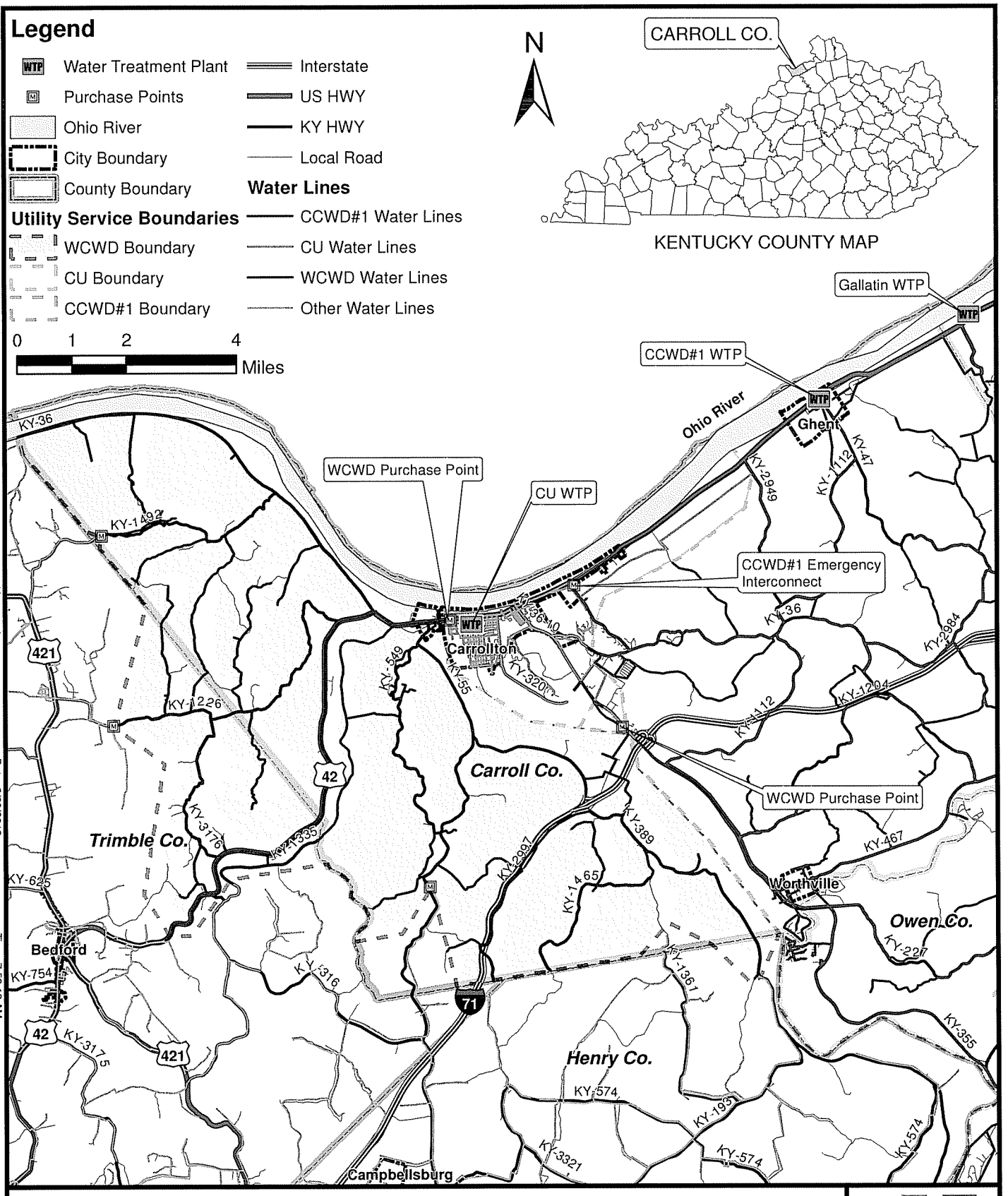
EXISTING WTP OPERATION

A. Location, Service Area, and Demands

The CU WTP is located within Carrollton, Kentucky, and has been drawing and treating water from local groundwater wells for more than 30 years. The CU WTP provides potable water for 2,037 service connections throughout the City of Carrollton (City) and wholesales to the WCWD, which has approximately 1,920 service connections and a population of approximately 7,300. CU has an emergency interconnect with Carroll County Water District No. 1 (CCWD1). Figure 1 shows the location of the CU WTP and its service area. Operators report a peak day demand of 1 million gallons per day (mgd) with demand in excess of 1.5 mgd under a rare firefighting event. Average demand is 0.75 mgd.

B. Existing Plant Type and Capacity Evaluation

The existing WTP is a groundwater lime-softening plant with a design capacity of 1.5 mgd. Figure 2 shows an aerial view of the WTP site. Figure 3 shows a schematic of the existing WTP processes.



CARROLLTON UTILITIES WTP LOCATION AND SERVICE AREA

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER CARROLLTON UTILITIES CARROLLTON, KENTUCKY

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FIGURE 1
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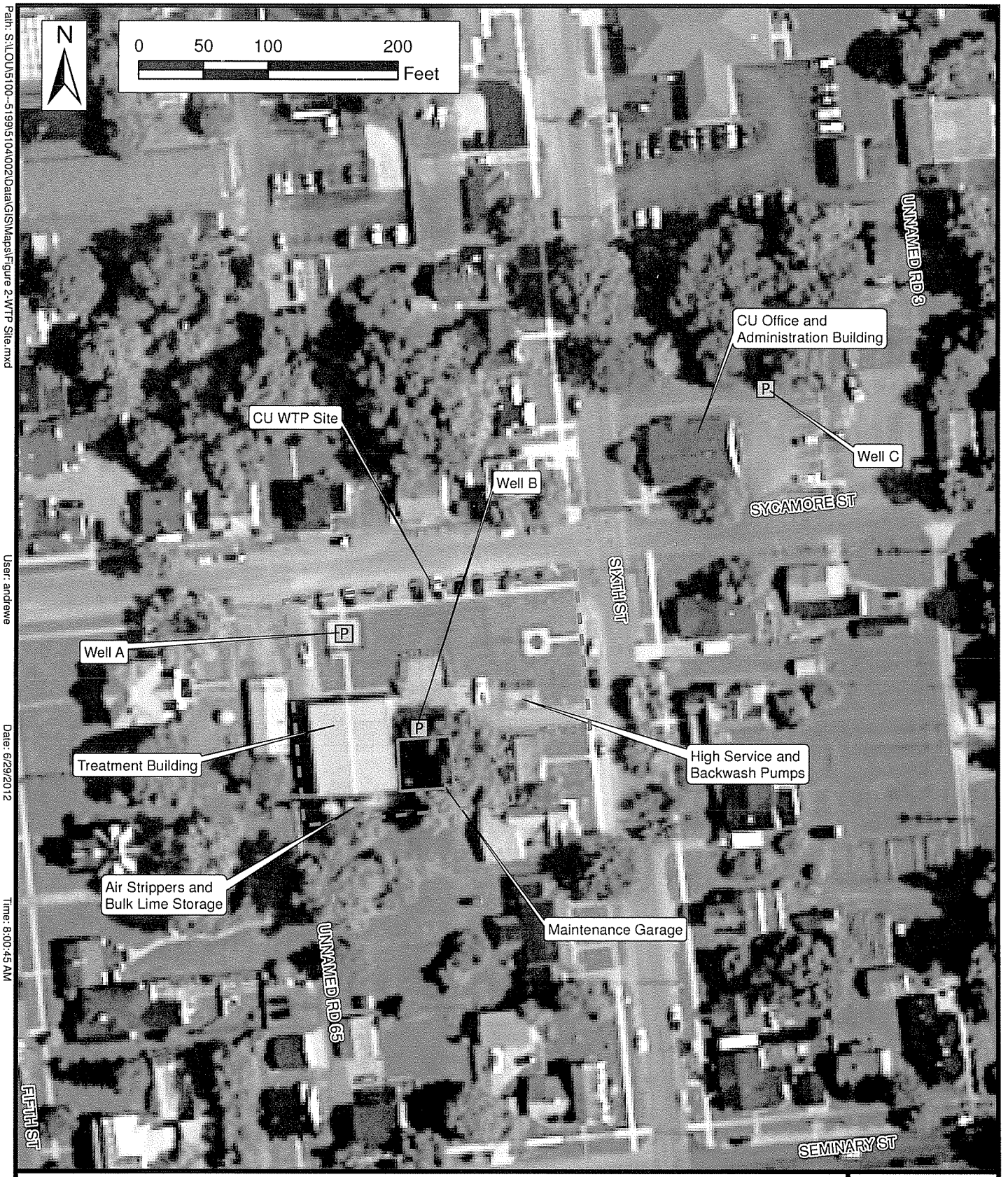

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CARROLLTON UTILITIES WTP SITE

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER CARROLLTON UTILITIES CARROLLTON, KENTUCKY

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FIGURE 2
5104.002

EXISTING WATER TREATMENT PLANT SCHEMATIC

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER CARROLLTON UTILITIES CARROLLTON, KENTUCKY

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FIGURE 3

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The following is a summary of the unit processes at the existing WTP and evaluation of each unit's ability to provide reliable drinking water under current demands and potential for increasing flow rates through the unit processes. This section identifies issues with treatment capacity and performance to develop future improvement.

1. Raw Water Well Pumps

The raw water source consists of three wells and associated pumps. Operators report well pumping capacity of 1,100 gallons per minute (gpm) with one of the two large pumps and one smaller pump in operation. A new raw water main was installed several years ago. No major problems have been reported with these pumps.

2. Air Strippers

Air-stripping is a technology used to remove volatile organic compounds (VOCs) from water. The existing air strippers consist of two identical 5-foot by 5-foot by 25-foot towers partially filled with column-packing material. Raw groundwater enters the top of the towers through a set of spray nozzles that distribute flow down through the tower. Blowers located at the base of each tower force air up through the tower as the water descends across the packing material. This process strips the water of VOCs and transfers it to the air blowing up through the towers. The air strippers for the CU WTP were designed to liberate dissolved trichloroethylene (TCE) gases from the raw water supply. At a combined flow of 900 gpm (450 gpm per tower), the air strippers were designed to reduce TCE influent concentrations in the raw water of 200 micrograms per liter (µg/L) by 99.9 percent, reducing the effluent concentration to 0.2 µg/L. The United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for TCE is 5 µg/L. Decontaminated water collects at the bottom of the towers and flows by gravity to the low lift pump station.

No major problems have been reported with the air strippers. The air strippers are currently meeting the required TCE concentrations while operating the raw water well pumps at 1,100 gpm. Although the manufacturer has indicated that limits could be met at significantly higher flows, the operation and maintenance manual lists the design capacity at 900 gpm. The most cost-effective way to add additional capacity is to provide additional media or change the media size.

3. Low Lift Pump Station

Flow from the air strippers discharges into the low lift pump pit by gravity. The low lift pump station has one pump that discharges flow into the head tank. The low lift pump is designed to provide 1,500 gpm (2.1 mgd) to the head tank. The self-priming centrifugal pump replaced two submersible pumps approximately two years ago.

A summary of concerns related to the low lift pump station is that there is currently no redundancy in low lift pumping operation. A loss of this pump, even under current conditions, would result in the inability to discharge water into the head tank and require emergency repairs or acquisition of a replacement.

4. Head Tank

The low lift pump station discharges into the head tank. Water from the head tank flows by gravity into the bottom of the claricone.

There are no specific design requirements associated with the head tank. Its purpose is to provide stable head conditions to the claricone. Additional flow through downstream treatment units could push the required head above that available but does not appear to be the case within the alternatives reviewed in this report.

5. Claricone

The claricone is an inverted cone-shaped solids contact clarifier. Flow enters the claricone by gravity from the head tank through a 12-inch line and a 8-inch line at the base of the cone. The claricone is designed to accomplish the following:

a. Mixing of treatment chemicals (lime) with the raw water to form floc in the mixing and reaction zone.

b. Solids contact and agglomeration in the flocculation zone.

c. Solids separation in the clarification zone.

d. Slurry concentration and compaction in the slurry concentrator.

The influent lines are positioned to cause a rotational flow within the claricone. Lime is added to the influent lines before they enter the claricone. The shape and location of the influent lines cause an expanding helical flow path that provides a smooth transition from rapid mixing near the base of the claricone to gentle mixing near the top. The energy for this process is provided by flow from the head tank. Clarified water flows by gravity from the top of the claricone to the recarbonation tank. Sludge is discharged approximately twice a day through the 6-inch slurry blowdown line located at the base of the claricone. Sludge is discharged into a sewer that drains into four sludge drying beds located near 2nd Street.

Table 1 shows the design parameters for the existing WTP claricone for the treatment of groundwater.

Parameter	Units	Existing	Ten State Standards (2007)	Manufacturer Recommended Value
Claricone Units	No.	1	N/A	N/A
Design Flow/Unit	gpm	1,042	N/A	N/A
Claricone Diameter	ft	30	N/A	N/A
Surface Area	ft^2	707	N/A	N/A
Volume/Unit	gallons	45,900	N/A	N/A
Detention Time	minutes	44	60 - 120	> 40
Overflow Rate	gpm/ft^2	1.47	< 1.75	< 2

ft=feet, ft^2=square feet

Table 1 Claricone Design Criteria

The following is a summary of concerns related to the claricone:

a. With only one unit available, the existing WTP has no redundancy.

b. Current flow conditions result in detention time approaching the minimum recommended by the manufacturer. Future flow conditions will reduce detention time below manufacturer recommended values.

c. Detention time under current flow conditions does not meet Ten State Standards, though the quality of the treated water indicates current detention time is sufficient.

d. Increased flow conditions will result in an overflow rate exceeding manufacturer recommended values.

e. Sludge from the claricone is discharged to four sludge drying beds located near 2nd Street. CU desires to reduce or eliminate the drying beds, if possible. While CU reports that only two beds are required at current demands, increased production utilizing the lime softening process would require additional lagoon space or alternate residuals treatment such as a sludge dewatering unit.

6. Recarbonation Tank

The purpose of the recarbonation tank is to provide sufficient retention time for the adjustment of pH by introducing carbon dioxide bubbles into the water to lower the pH. This process converts carbonate ions to bicarbonate ions and stabilizes the solution against the precipitation of carbonate compounds. Effluent from the claricone flows by gravity into the recarbonation tank. Table 2 shows the design criteria for the recarbonation tank.

Parameter	Units	Existing	10 State Standards (2007)
Tank Units	No.	1	N/A
Design Flow/Unit	gpm	1,042	N/A
Tank Diameter	ft	8	N/A
Height	ft	18.83	N/A
Volume / Unit	gallons	7,080	N/A
Detention Time	minutes	6.8	20

Table 2 Recarbonation Tank Design Criteria

The recarbonation equipment inside the tank was replaced in 2012.

The following is a summary of concerns related to the recarbonation tank:

a. With only one unit available, there is no redundancy with this process.

b. Though the recarbonation tank is providing sufficient reduction in pH, current flow conditions result in detention time less than the minimum listed by Ten State Standards. Future flows will reduce detention time even further and a variance from the Kentucky Division of Water (KDOW) from the standard will likely be required if capacity is not increased with an increase in flow to the unit.

7. Filters

The CU WTP operates two-tapered bed mixed-media filters with areas that increase with depth. Stabilized water from the recarbonation tank flows by gravity to the two filters. Clarified water enters the filters through a trough in the center of each filter that distributes water evenly across the filter. Water then passes through the mixed media and is collected by a filter block underdrain system at the bottom of the filter. Filtered water is conveyed by gravity to the clearwell through a 12-inch effluent line.

The filters are backwashed periodically according to a schedule. The backwash pump is located next to the high service pumps on top of the clearwell. The backwash pump conveys water from the clearwell to the bottom of the filters and is distributed evenly across the filter by the underdrain system. An air scour system is also provided to break up compacted filter media to aid the backwash process.

Table 3 shows the design parameters for the existing WTP filters.

Parameter	Units	Existing	10 State Standards (2007)
Filter Units	No.	2	≥ 2
Design Flow/Unit (with 2 in service)	gpm	1,042	N/A
Dimensions (L x W)	ft	16 x 10	N/A
Filter Area, each	ft^2	160	N/A
Filter Loading Rate (2 in service)	gpm/ft^2	3.26	2 to 4
Filter Media, Depth-Type	ft	1.5 - Anthracite 1 - Sand	2 to 2.5
Support Media, Depth-Type	ft	1 - Gravel	N/A
Backwash Pumps	No.	1	N/A
Backwash Flow Rate	gpm	3,200	N/A
Backwash Loading Rate	gpm/ft^2	20	> 15
Air Scour Rate	$scfm/ft^2$	4.5	3 to 5
Influent Pipe Diameter	inch	12	N/A
Influent Pipe Velocity	fps	1.5	< 2

ft=feet, ft^2=square feet, scfm=standard cubic feet per minute

Table 3 Filter Design Criteria

The following is a summary of concerns related to the filters:

a. At current flows filter loading rate will exceed maximum rates recommended by Ten State Standards if only one filter is in operation.

b. Increased flows cause the filter loading rate to exceed maximum rates established by Ten State Standards with both filters in operation.

c. There is currently no redundancy in the backwash process.

8. Disinfection and Clearwell Storage

Chlorine gas is used for disinfection and is applied between the filters and the clearwell. Table 4 lists the existing design parameters and associated virus removal credit.

Parameter	Units	Existing Value
Clearwell Volume	gallons	239,000
Design Flow	gpm	1,042
Clearwell Volume (as % of WTP capacity)	%	16
Contact Time (CT)	minutes	229
Chlorine Residual	mg/L	1.2
Baffling Factor	unit less	0.5
Full Volume CT	mg-min/L	137
Water Temperature	°C	15
pH		7.5
Full Volume Log Inactivation - Viruses	log units	>4

mg/L=milligrams per liter, mg-min/L=milligrams per minute per liter

Table 4 Virus Removal Credit

The Groundwater Treatment Rule states that a ground water system is subject to triggered source water monitoring if it does not already provide treatment to reliably achieve at least 99.99 percent (4-log) inactivation or removal of viruses. Results, utilizing the USEPA's CT Calculator with the specified values listed above, indicate that adequate disinfection contact time can be maintained even with a large increase in WTP capacity.

The CU WTP clearwell is a baffled underground concrete tank with a total volume of approximately 239,000 gallons. The amount of storage is approximately 16 percent of the rated 1.5 mgd treatment capacity. KDOW requires facilities to have approximately 15 percent of rated capacity clearwell storage for adequate hydraulic storage for standby and emergency use. If treatment capacity is increased, additional storage will be required or a variance will need to be requested from KDOW.

A summary of concerns related to the disinfection and clearwell is that clearwell storage will need to increase if plant capacity is increased, or a variance from KDOW will be needed.

9. Chemical Treatment

The following is a summary of the chemical feed systems used to treat water before distribution at the CU WTP:

a. Lime feed system used for reducing hardness. Lime is fed into the base of the claricone.

b. Polymer feed system is used as a coagulant aid. Polymer is fed into the base of the claricone.

c. Chlorine feed system is used for disinfection. Chlorine is fed into the filter effluent. Operators report less than 50 percent capacity of the feed system is required at maximum plant flow.

d. Hydrofluorosilicic Acid (fluoride) is used as a dentifrice to reduce tooth decay. Fluoride is fed into the filter effluent. Operators report less than 50 percent capacity of the feed system is required at maximum WTP flow.

e. Caustic soda was previously used to reduce hardness. Though caustic soda storage is available on-site, it is no longer in use for the treatment process.

The existing chemical feed systems currently have enough capacity to accommodate the existing design flow rate with spare capacity; therefore, no changes are required for the chemical feed systems.

10. Residuals Handling

The existing filter backwash waste and claricone-generated sludge currently discharge to a sewer that flows to four lagoons located several blocks from the WTP. CU reports that only two of the lagoons are needed at any one time for current operations. Increased WTP production utilizing the lime softening process would require additional lagoon storage (beyond the two currently needed) or an alternate residuals handling method, such as sludge dewatering, would be necessary.

Discharging the current filter backwash water into the sanitary sewer system for treatment at the wastewater treatment plant (WWTP) would further enhance the ability of two lagoons to sufficiently accommodate the lime softening sludge. Based on information from CU, the WWTP has the capacity to receive the filter backwash water.

A summary of concerns related to the residual handling is that the lagoon facility is located in an area of the City that is experiencing new development and interest. Though total elimination of the ponds is desired, the existing residual handling facility can be reduced in size but not likely eliminated unless other means of disposing of the lime sludge is developed. Redundancy should be maintained.

C. Existing WTP Operation and Staffing

The existing WTP operates approximately 12 hours a day to provide adequate water volume to keep distribution storage tanks filled within their set operating ranges. Staffing hours can exceed 16 hours under peak-day demand conditions. Though the WTP is meeting existing demands with current operating conditions, planning for system growth (specifically new industrial customers) is of particular concern to CU. In addition, the existing WTP has minimal redundancy; therefore when problems occur, the WTP may need to be taken completely out of service for repair.

WTP ratings are assigned based on two parameters: rated capacity (e.g., III or IV) and staffing requirements (e.g., A or B). The WTP is currently rated at 1.5 mgd, treating groundwater not under the direct influence of a surface water, using gravity filtration. Therefore, it is currently classified as a Class III A facility. If the improvements include additional gravity filtration capacity and the rated capacity of the WTP increases to 3 mgd or more, the WTP will be rerated as Class IV A facility, with associated revised operator requirements.

A summary of concerns related to WTP operations and staffing is that the primary concern is related to the rerating. As CU's goal is to reduce the operations staff man-hours at the WTP, an increase in rated capacity could actually cause an increase in staff requirements. The Treatment Alternatives and the Conclusion sections address WTP rating further.

D. Water Source

The CU WTP uses three local wells, two within the WTP site and a third on the CU administrative building property, as its source for groundwater. Figure 2 shows the location of the three wells. Table 5 summarizes the information on the wells as listed in the Assembled Kentucky Groundwater Database. CU will continue to use these three wells as its water source after the proposed WTP improvements have been completed.

Well Name	AKGWA ID[1]	Latitude	Longitude
Well A	00020667	38° 40' 46.38" N	85° 10' 45.84" W
Well B	00004033	38° 40' 51.82" N	85° 10' 36.96" W
Well C	00020670	38° 40' 47.84" N	85° 10' 48.39" W

[1]AKGWA ID=Assembled Kentucky Groundwater Database Identification Number.

Table 5 Groundwater Source Well Information

1. Groundwater Yield

CU's current withdrawal permit, No. 0129, limits the total withdrawal from all three wells as follows:

a. 0.85 mgd January through May
b. 1.0 mgd June through August
c. 0.85 mgd September through December

Although the design capacity of the existing CU WTP is 1.5 mgd, it is typically operated about 12 hours a day, as discussed above. Therefore, CU is currently withdrawing water within the limits of its current permit. A new permit will be required to increase the maximum withdrawal above this rate.

A summary of concerns related to the groundwater yield is that CU reports having a prior groundwater study indicating water availability in excess of the current limits; therefore, there does not appear to be any concerns with source water capacity.

E. Water Quality

1. Groundwater Quality

Available groundwater data for the three wells from lab test results provided in May 2012 is shown in detail in Appendix A. Select Monthly Operating Report (MOR) data is also included for reference.

Lab results indicate that no primary drinking finished water standards were exceeded within the raw water. Table 6 displays a list of other water quality parameters of interest.

Parameter	Units	Well A (1)	Well B (2)	Well C (3)	Post Air Stripper*	Secondary USEPA MCL
Iron Related Bacteria	CFU/mL	25	<10	<10	NA	-
Iron	mg/L	0.19	0.18	0.60	0.14	0.3
Manganese	mg/L	0.12	0.11	0.13	0.11	0.05
Total Hardness (as CaCO3)	mg/L	432	434.1	398	406.9	-
TDS	mg/L	616.7	543.3	510.0	533.3	500
Sodium	mg/L	28.4	23.3	20.7	21.1	-

* Results obtained with water from two wells combined.
CaCO3=calcium carbonate, CFU=Colony forming units per milliliter

Table 6 Select Sampling Results vs. Secondary MCL Levels

The following is a summary of concerns related to the groundwater quality:

a. Table 6 shows that Well C has an elevated level of iron. By utilizing the air stripper and mixing groundwater from one of the other two wells these impacts can be mitigated. Initial iron related bacteria levels in Well C were also elevated. A resampling of water from this source indicated the level as reported in Table 6. According to CU staff this level is more representative of actual water quality given the sampling methodology and conditions. Manganese levels are somewhat elevated and could be a source of customer aesthetic complaints, if not reduced.

b. Finished water total dissolved solids (TDS) values have not exceeded the secondary limit and this does not appear to be a concern.

2. Treated Water Quality

The CU WTP consistently produces a high quality effluent that meets all primary drinking water MCL standards. Secondary MCL concerns as a groundwater treatment facility include reduction of iron, manganese, and hardness. Table 7 shows the average effluent iron, manganese, and hardness levels for the CU WTP. These results are based on select MOR data provided in Appendix A, which also show daily treated water quality for the CU WTP.

Parameter	Units	Average Treated Concentration	Secondary USEPA MCL
Iron	mg/L	0.03	0.3
Manganese	mg/L	0.04	0.05
Hardness	mg/L	183	-

Table 7 Select Finished Water Quality Data

There are currently no reported concerns related to the treated water quality.

WATER QUALITY AND OPERATIONAL GOALS

CU has identified the following goals for the WTP improvements, which are to:

1. Limit the sludge production so that additional sludge drying beds are not required, and potentially reduce or eliminate the existing drying beds.

2. Reduce operator time requirements to one 8-hour shift a day.

3. Maintain or improve existing effluent water quality.

4. Maintain a treated water hardness below 200 mg/L.

5. Provide treatment redundancy so that equipment can be taken offline for maintenance.

These goals were taken into consideration when selecting the appropriate treatment alternative for the CU WTP expansion.

TREATMENT ALTERNATIVES

A preliminary evaluation was conducted to consider whether the existing treatment site could be used or a new treatment site would be required to accommodate project demands and new equipment. Given the relatively good condition of the structures, equipment, WTP site, and availability of land, the existing plant facilities should be able to operate and accommodate the WTP expansion. Therefore, the alternatives presented below are based on utilizing the existing WTP site.

Three alternatives were considered to increase the design capacity of the CU WTP:

A. Alternative 1: Increase Lime Softening and Filter Capacities

Alternative 1 essentially involves duplicating the existing treatment process to create two treatment trains each with a treatment capacity of 1.5 mgd. This will allow CU to produce up to 1 mgd during a single 8-hour period each day. Figure 4 shows a schematic of Alternative 1, which includes the following improvements:

1. Increase well pumping capacity.

2. Add media to the air strippers.

3. Add two low lift pumps to increase capacity and provide redundancy. New low lift pumps would be equipped with variable frequency drives (VFDs) to control flow through the WTP.

4. Install a second claricone identical to the existing claricone. Because of the size of the claricone, placing another in service would require a new building or building expansion.

ALTERNATIVE 1 TREATMENT SCHEMATIC
EXISTING PROCESS EXPANSION WITH SLUDGE DEWATERING

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER
CARROLLTON UTILITIES
CARROLLTON, KENTUCKY

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FIGURE 4
5104.002

5. Install new sludge dewatering equipment to meet CU's goal of reducing sludge production.

6. Install a new recarbonation tank. The new recarbonation tank will need to be approximately three times larger than the existing tank to meet current detention time requirements in Ten State Standards. A smaller unit could provide redundancy with a variance given from KDOW.

7. Install two new filters identical in size to the existing filters. Because of the placement of the filters, new filters would require a building expansion.

8. Install a backup filter backwash pump or connection to distribution system.

9. Install a new 8- to 12-inch transmission main to the General Butler storage tank to accommodate the increased instantaneous flow rate.

10. Install new gravity main to existing wastewater pump station to divert filter backwash from the sludge holding ponds.

The advantage of this alternative is that operators are familiar with the process.

The disadvantages of this alternative include the following:

1. New equipment would require a new building or considerable building expansion. This translates to a higher cost than Alternative 2.

2. Additional sludge processing and dewatering equipment required to meet goal of reduced sludge production.

3. To avoid a reclassification of the plant to Class IV A, the plant would have to treat water at a rate just under 3 mgd.

4. To reduce staffing requirements at existing demand, transmission main improvements are required.

B. Alternative 2: Ion Exchange Softening

Alternative 2 includes adding a parallel ion exchange softening treatment plant to the existing treatment facilities. The ion exchange treatment process will be rated for 1.5 mgd and will be designed to run separately from the existing treatment process, increasing the total potential treatment capacity to 3 mgd, dependent upon well capacity. Total WTP capacity will be *rated* at less than 3 mgd since well capacity is currently only 1.6 mgd. Figures 5, 6, and 7 show a schematic, site plan, and treatment building plan of Alternative 2, respectively, which includes the following improvements:

ALTERNATIVE 2 TREATMENT SCHEMATIC
ION EXCHANGE PLANT

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER
CARROLLTON UTILITIES
CARROLLTON, KENTUCKY

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FIGURE 5
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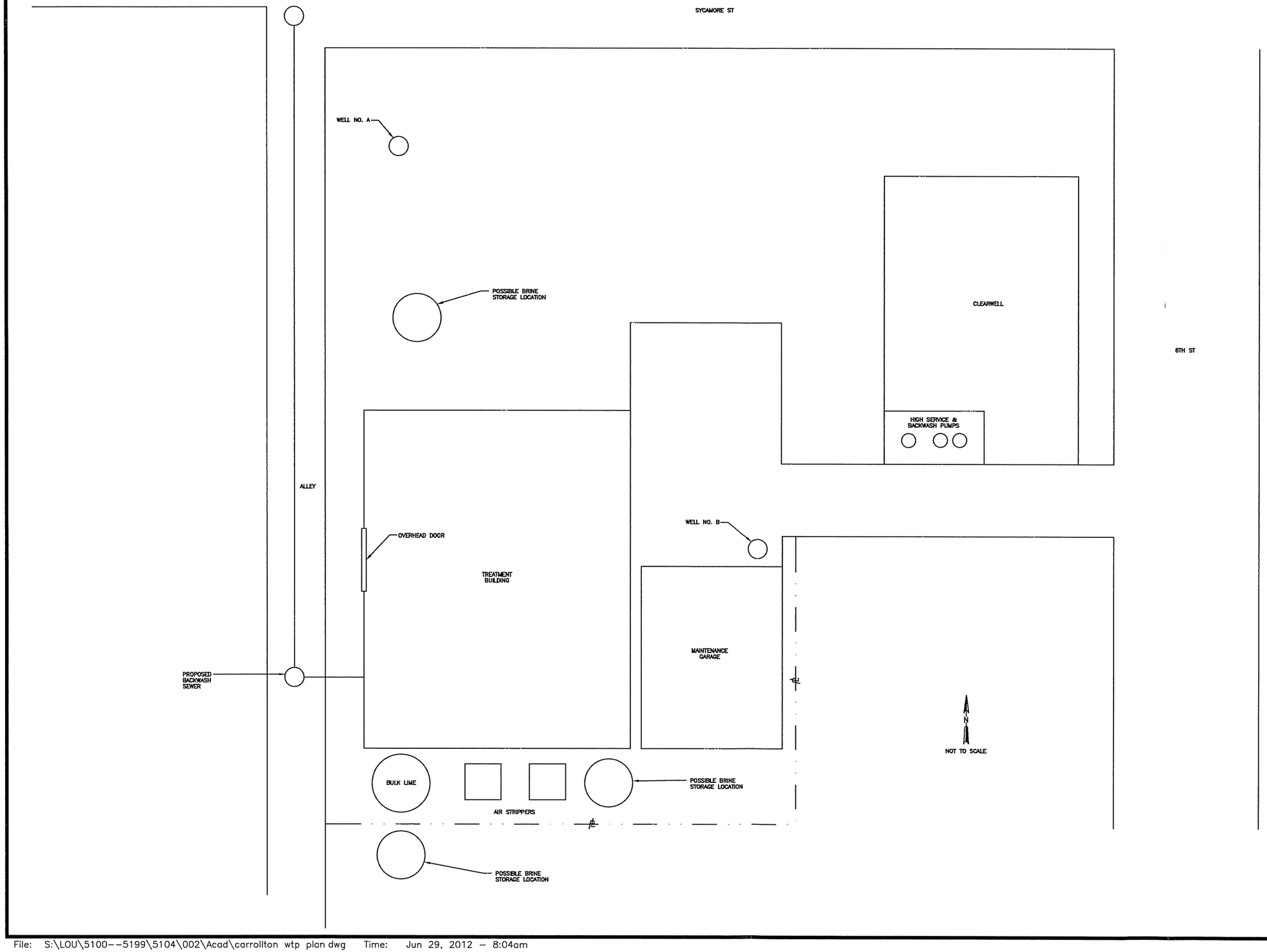

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REVISIONS

DATE:

ALTERNATIVE 2 PROPOSED WTP SITE PLAN

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER
CARROLLTON UTILITIES
CARROLL COUNTY, KENTUCKY

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PROJECT MGR.

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FIGURE 6

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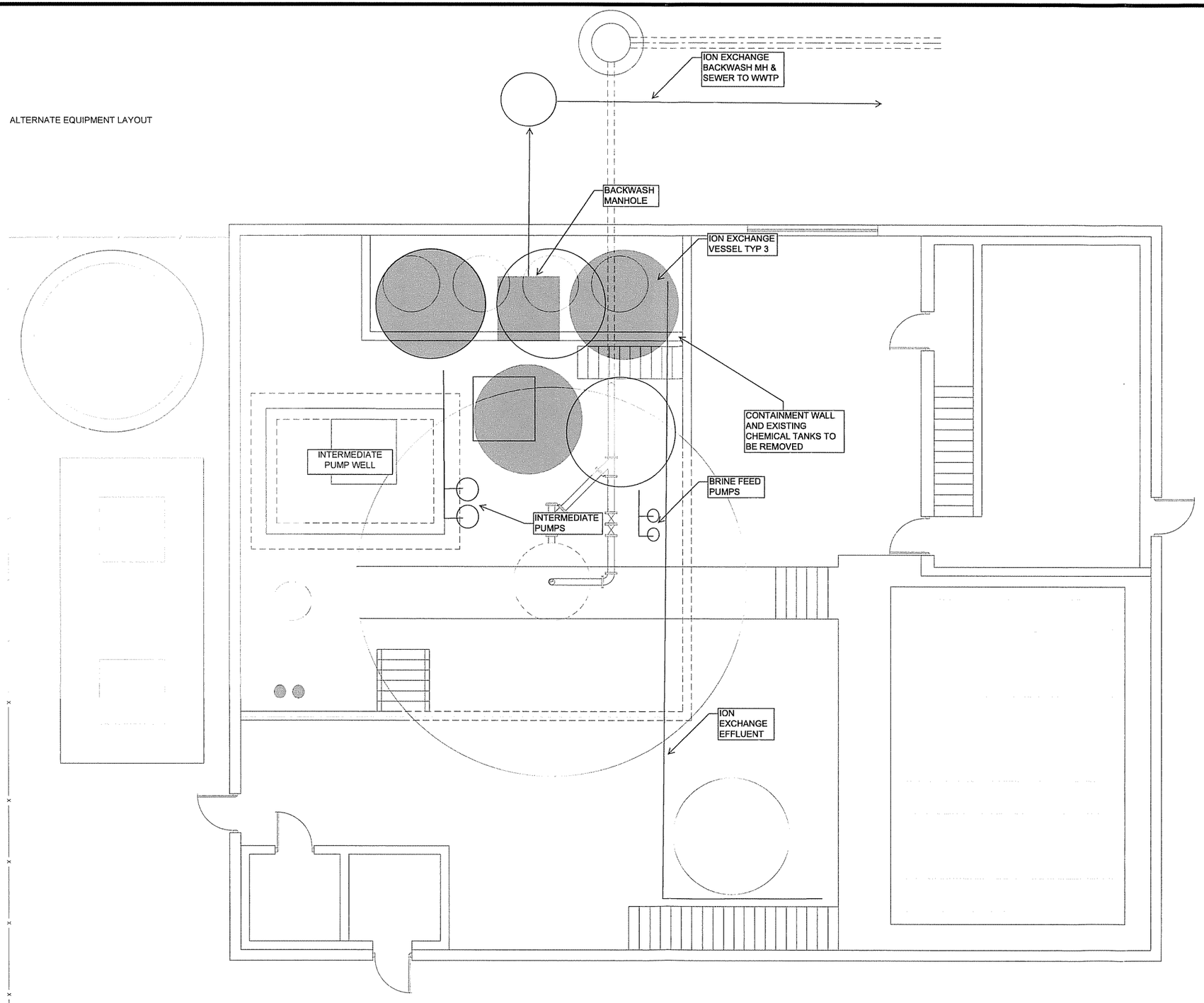
ALTERNATE EQUIPMENT LAYOUT



PLAN

0 1' 2' 4' 8'

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NO.	REVISIONS	DATE:

ALTERNATIVE 2 PROPOSED TREATMENT BUILDING PLAN

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS
CARROLLTON UTILITIES
CARROLL COUNTY, KENTUCKY

JOB NO.
5104.002

PROJECT MGR.

STRAND ASSOCIATES®

FIGURE 7

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1. Add one low lift pump to provide redundancy. The new low lift pump would be equipped with a VFD to control flow through the WTP. The required head at 1,040 gpm is anticipated to be between 27 and 40 feet depending on operating condition but could be sized to match the existing pump. Controls requirements will be reviewed during final design to confirm the existing pump can be utilized for this application.

2. Install three ion exchange units with a total design capacity for all three units of 1.5 mgd. The caustic soda tanks and containment walls would be removed to make room for the ion exchange units.

3. Provide a new brine system including brine storage and feed pumps.

4. Provide a new sewer line from the WTP to a nearby sanitary manhole to receive backwash from the ion exchange units.

The advantages of Alternative 2 include the following:

1. New equipment would not require a new building or building expansion.

2. Reduced sludge production.

3. Reduced operator time requirements because of a different treatment classification. Since there is not a filtration step, the ion exchange WTP should be considered a Class III B facility if it is rated separately from the lime softening process. Although KDOW staff are uncertain of the exact rating designation of the WTP, they have stated that the ion exchange process can be operated in a semiautomated condition with reduced operating requirements similar to a Class III B rating.

4. All existing equipment still available for use as second treatment train.

5. Delayed distribution system improvements. An ion-exchange WTP can be operated over a longer period of time while still reducing staffing requirements at the WTP because of the difference in classification mentioned previously. Treating water at the current production rate and number of production shifts or at a reduced rate for an additional shift postpones the need for transmission main improvements which would be required to accommodate higher instantaneous flow rates from the WTP described in Alternatives 1 and 3.

The disadvantages of Alternative 2 include the following:

1. Effluent concentrations of sodium and manganese will need to be balanced.

2. Operators are not currently treating water with the process.

3. Water quality aesthetics will be different than the existing finished water.

C. Alternative 3: Fluidized Bed Reactors

Alternative 3 is similar to Alternative 1 except the additional claricone is replaced with two fluidized bed reactors (FBRs). Figure 8 shows a schematic of Alternative 3, which includes the following improvements:

1. Increase well pumping capacity.

2. Add media to the air strippers.

3. Add two low lift pumps to increase capacity and provide redundancy. New low lift pumps would be equipped with VFDs to control flow through the WTP.

4. Provide two new FBRs.

5. Install a new recarbonation tank. The new recarbonation tank would need to be approximately three times larger than the existing tank to meet current detention time requirements in Ten State Standards.

6. Install two new filters identical in size to the existing filters. Because of the placement of the filters, new filters would require a building expansion.

7. Provide a sand retention basin to receive FBR backwash for later removal and disposal.

8. Install a backup filter backwash pump or connection to distribution system.

9. Install new 8- to 12-inch transmission main to the General Butler storage tank to accommodate increased flows.

10. Install new gravity sewer main to existing wastewater pump station to divert filter backwash from the sludge holding ponds.

The advantages of Alternative 3 include the following:

1. Reuses most of existing equipment.

2. Does not increase sludge production.

The disadvantages of Alternative 3 include the following:

1. Filter expansion and FBR addition would require new building or building expansion.

2. Although sludge is reduced, FBR process would require sand removal.

ALTERNATIVE 3 TREATMENT SCHEMATIC
FBR SOFTENING ADDITION WITH FILTER EXPANSION

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER CARROLLTON UTILITIES
CARROLLTON, KENTUCKY

STRAND ASSOCIATES®

FIGURE 8
5104.002

3. To avoid a reclassification of the plant to Class IV A, the WTP would have to treat water at a rate just under 3 mgd.

4. To reduce staffing requirements at existing demand, transmission main improvements are required.

5. Operators are not currently treating water with the process.

6. Water quality aesthetics will be different than the existing finished water.

ALTERNATIVE SELECTION AND CONSIDERATIONS

The ion exchange alternative offers a combination of reduced operations, process stability, and cost-effectiveness. Any changes to water aesthetics can be mitigated by the ability to operate the existing lime softening process for portions of the day. After reviewing the alternatives, Alternative 2 was selected as the preferred alternative.

A. Process Considerations

Table 8 provides a proposed list of design criteria for the ion exchange process. The design criteria, specifically the bypass rate, was chosen to reduce the treated water manganese levels below 0.05 mg/L and establish a maximum reduction in manganese and total hardness that may be required of the equipment. In operating the ion exchange units, operations staff will need to balance treatment of aesthetic water quality (nonprimary drinking water) constituents including hardness, sodium, and manganese. As additional flow above the design criteria shown is bypassed around the ion exchange units, the treated water hardness and manganese levels will increase while sodium levels will decrease.

TABLE 8–ION EXCHANGE DESIGN CRITERIA

Parameter	Value			Units
Raw Water Quality				
	Minimum	Maximum	Average	
Total Hardness	360	466	424	mg/L as CaCO3
Calcium Hardness	270	290	282	mg/L as CaCO3
Magnesium Hardness	90	176	142	mg/L as CaCO3
Alkalinity	320	350	336	mg/L as CaCO3
Sulfates	45	51	48	mg/L as SO4
Iron	0.14	0.6	0.32	mg/L as Fe
Manganese	0.11	0.18	0.12	mg/L as Mn
Sodium	21	28	24	mg/L
pH	6.7	8	7.44	none
Treated Water Quality				
	Minimum	Maximum	Average	
Total Hardness[1]	90	207	182	mg/L as CaCO3
Calcium Hardness	68	129	121	mg/L as Ca
Magnesium Hardness	23	78	61	mg/L as Mg
Sulfates	45	51	48	mg/L as SO4
Iron	0.04	0.27	0.14	mg/L as Fe
Manganese[2]	0.03	0.05	0.05	mg/L as Mn
Sodium[3]	91	189	135	mg/L
Plant				
	Min	Max	Avg	
Capacity	1,040	1,040	1,040	gpm
% Bypass[4]	25	45	43	%
Bypass Flow	260	463	447	gpm
Treated Flow	577	780	593	gpm
Demand		1	0.75	mgd

[1]Minimum calculated from bypass required for maximum required Mn removal needed at minimum raw hardness.
[2]Maximum calculated from bypass required for maximum Mn removal needed at maximum raw Mn.
[3]Maximum calculated from bypass required for maximum Mn removal needed at maximum raw hardness; minimum calculated from minimum raw hardness and maximum treated hardness.
[4]Minimum calculated from maximum required for Mn removal needed at maximum raw Mn.

TABLE 8–ION EXCHANGE DESIGN CRITERIA (CONTINUED)

Parameter	Value	Units
Softeners		
Type		Vertical Pressure
Number of units, n	3	Units
Operating Mode	2	in Service - 1 Standby
Total Softener Height	9.98	ft
Softener Side Shell Height	4.08	ft
Diameter	8.5	ft
Area (ea)	56.7	ft^2
Loading Rate (n units in service)	4.6	gpm/ft2 (maximum)
Loading Rate (n-1 units in service)	6.9	gpm/ft2 (maximum)
Resin Depth	3	ft (minimum)
Treatment Capacity	20,000	g/cf (maximum)
Bed Capacity (ea)	3,402,975	grains
Resin Volume per Vessel	170	ft^3
Backwash Rate	284	gpm
Backwash Rate	5.0	gpm/ft^2
Backwash Duration	10	minutes
Backwash Volume	2,837	gallons
Regeneration	6.0	# salt /cf of resin
Brine Flow at 50% saturation	31	gpm
Brine Duration	25	minutes
Brine Volume at 50% saturation	775	gallons
Slow Rinse Flow	31	gpm
Slow Rinse Duration	25	minutes
Slow Rinse Volume	775	gallons
Fast Rinse flow	270.4	gpm
Fast Rinse Duration	10	minutes
Fast Rinse Volume	2,704	gallons
Total Waste per Regeneration	7,091	gallons
Average Total Hardness removed	25.4	grains/gallon
Volume treated between regenerations	133,817	gallons
Time between Regenerations	8.6	hours
Salt Storage Tank		
Number	2	
Salt Required per Regeneration	1,021	pounds
Salt Required per 1 MG treated	7,630	pounds
Salt Required per 1 MG blended finished water	5,722	pounds
30 Day Salt Supply @ Avg Day Demand	128,753	pounds
Salt Storage Tank Capacity	64	tons
Salt Storage Tank Capacity (ea)	32	tons

TABLE 8–ION EXCHANGE DESIGN CRITERIA (CONTINUED)

Parameter	Value	Units
Brine Pumps		
Number	2	
Type	By Equipment Manufacturer	
Capacity	15	gpm
Head	TBD	ft

As mentioned previously, the raw water from Well C has somewhat elevated levels of iron. Ten State Standards provide the following design considerations: iron, manganese, or a combination of the two, should not exceed 0.3 mg/L in the water as applied to the ion exchange resin. Pretreatment is required when the content of iron, manganese, or a combination of the two, is one milligram per liter or more. Therefore, the air strippers should continue to be utilized and effluent iron and manganese levels monitored. If water from Well C is utilized, it should be blended with water from one of the other two wells.

The equipment sizes and number were chosen to meet Ten State Standards and project requirements. The existing overhead door on the alley side of the WTP building will accommodate 8.5-foot-diameter softener units. Such units will also fit within the space available in the treatment building. Three units are required so that maximum loading rates are not exceeded with one unit out of service. For short periods of time, higher flow rates could be obtained with all three units in service. Brine storage in excess of 64 tons is required to meet 30-day storage requirements. Two 36-ton units are recommended to meet redundancy requirements. Multiple units facilitate one tank being taken offline for cleaning while the other remains in service.

CU may choose to utilize a coarse rock salt product, a solar salt or a granulated food grade salt.

Ion exchange equipment manufacturers indicate the food grade salt requires a gravel bed to be placed in the bottom of the brine maker. The coarse salt does not require the gravel subfill and is much more cost-effective. However, the coarse salt can contain traces of dirt which, over time, will require maintenance to remove sludge from the brine tanks. This manufacturer also offers a solar salt that is a cleaner product, similar in size to the rock salt. The cost for this product is between the rock salt and granulated salt products.

Budgetary costs for the three provided by a regional salt supply company are shown below. The prices include delivery of a minimum of 25 tons via a pneumatic truck.

Bulk Southern Coarse Rock Salt: $115.00 per ton
Bulk Solar Salt: $135.00 per ton
Bulk Granulated Special Purity Salt: $156.00 per ton

At average raw water hardness and average water production, the amount of salt required could range from 48 to 64 tons per month depending on the amount of water bypassing the softeners. This would translate into an average of $6,500 to $8,600 a month in salt expenses. Current lime expenses have been between $4,000 to $5,000 per month.

The peak discharge rate from the backwash process is expected to be 284 gpm. An 8-inch sewer laid at minimum grade should be able to accommodate this flow. Given that it is expected that there will still be at least two lagoons available for use if the existing filtration process is utilized, the sewer will be designed to accept only the ion exchange backwash and not the filter backwash. The receiving point of this flow is expected to be a manhole at the intersection of the alley to the west of the WTP and Sycamore Street. CU staff indicated the sewer collection system is capable of handling this flow.

At the above-referenced salt usage a month, the daily average chloride waste level is expected to be approximately 2,600 pounds per day. At the WWTP design flow rate of 3.4 mgd, this equates to approximately 90 mg/L of chlorides being added to the effluent. At the average dry weather flow rate of 0.75 mgd, the concentration would be approximately 415 mg/L. The presence of chlorides in the waste stream will likely trigger KDOW to issue a chloride limit on the wastewater effluent, which will require sampling.

Typical water quality criteria levels for chlorides are 250 mg/L for human health, and 600 mg/L and 1,200 mg/L for chronic and acute warm water aquatic life protection, respectively. Meeting the human health and chronic aquatic related limits are further eased by the fact that the limits apply to the seven day 10 year low flow (7Q10) of the receiving stream, the Kentucky River, and not the effluent flow rate itself. At these limits, the chloride addition is not expected to have an impact on WWTP discharge compliance. Elevated chloride levels may result in higher rates of corrosion of equipment in the WWTP.

B. Structural Considerations

Based on our review of the record drawings, it appears that structural cast-in-place concrete equipment bases can be used to support the proposed ion exchange vessels. Therefore, we do not anticipate the need to cut the slab and provide isolated footings for the ion exchange vessels.

Additionally, we anticipate that an interior manhole or sump used to convey backwash to a new sewer in the adjacent alley can be constructed with cast-in-place concrete on the existing slab. This can be accomplished by constructing new walls and a slab or by constructing the walls directly on top of the existing slab. In either case, it is recommended the interior of the sump be treated with a flexible liner to reduce the potential for leaks.

The proposed ion exchange vessels and backwash manhole will likely conflict with an existing set of stairs to the lower level. To maintain this access into the lower level the existing stairs will need to be relocated or a new set of stairs will be needed. This will also require replacement or modification to the existing safety railing.

It is strongly recommended that a geotechnical investigation be performed on-site to properly design the brine storage facilities. The geotechnical investigation and report provide vital information during structural design and construction such as anticipated soil conditions, identification of poor soils, and recommended bearing pressures. This information is utilized during structural design to promote a cost-effective and safe design while reducing the risk of potential change orders during construction because of poor soil conditions. We can assist CU in obtaining cost proposals from geotechnical engineering firms as needed.

C. Electrical Considerations

The WTP electrical service is 600 amp, 480 volt, three phase, 60 Hz. The electrical service disconnect is a 600 amp circuit breaker located in the motor control center. Power is distributed to motors and other utilization equipment from the motor control center. Power for lighting, receptacles and other general loads is provided at 208"Y"/120 volt, three phase, 60 Hz from a dry-type transformer and panel board.

In a past WTP renovation project, the two high service pump starters were abandoned and replaced with a separate high service pump control panel. This panel is fed from the existing motor control center.

The motor control center contains abandoned starters and spaces that can be reconfigured for other purposes such as additional circuit breakers or motor starters. If new VFDs are utilized in a plant renovation, they will likely require remote mounting.

Based on actual demand the 600 amp service is adequate with some additional capacity available. Based on current future load projections, the 600 amp service will be adequate for the two low lift pumps. However, if proposed electrical loads exceed the 600 amp service, additional capacity can be provided in the motor control center by placing the existing high service pump control panel on a separate circuit and increasing the service conductor size.

PERMIT REQUIREMENTS

A KDOW drinking water permit to construct the proposed facilities will be required.

As previously mentioned, results of discussions with KDOW staff indicate that reduced staffing requirements will be allowed while utilizing the ion exchange units. As part of its response to this PER, it is expected that KDOW will address the rating of the facility, which may require an additional permit application, additional information included on MORs, or other documentation.

A building permit from the Kentucky Department of Housing, Buildings, and Construction (HBC) is not anticipated since no building additions are required for the preferred Alternative 2. Local building code requirements may require an approval of the proposed facilities.

If a withdrawal of groundwater greater than the current permitted quantity is desired, a revised permit application will be required.

OPINION OF PROBABLE COST

Table 9 is the opinion of probable cost summarized by key components.

Item	Cost
New Intermediate Pumps and Controls	$31,000
New Ion Exchange Sewer	15,000
Process and Yard Piping	50,000
Electrical	48,000
Site Work	20,000
Painting	25,000
Miscellaneous Structure Improvements	18,000
Installation of Ion Exchange Units and Appurtenances	89,000
Subtotal	**$296,000**
Planning Level Cost Opinion Contingency	74,000
Subtotal	**$370,000**
Contractor General Conditions and Profit	37,000
Ion Exchange Units and Appurtenances	444,000
Total	**$851,000**

Table 9 Planning Level Opinion of Probable Construction Cost

To reduce construction costs, the following options were considered:

1. Three 7-foot-diameter units or two 8.5-foot-diameter units could be provided in lieu of the three 8.5-foot-diameter units. This would require all units to be in service to meet design criteria standards. This would also reduce the time between regenerations to approximately 6 hours. Additional media depth could be provided which would allow the units to run nine to ten hours before requiring regeneration but raise the price.

2. Provide two 12-foot-diameter units, which would provide similar performance to the three 8.5-foot-diameter units. Though the number of valves and fittings would be reduced, the manufacturer indicated the overall cost would be more and, at this size, the installation of the units would be more challenging and may not be possible through the existing 12-foot by 10-foot overhead door.

DISTRIBUTION SYSTEM IMPROVEMENTS

A. General

The objective of the water distribution system improvements is to extend potable water service to new customers and improve service to existing customers. The long term capital improvement plan for the WCWD system includes additional improvements adjacent to this project area. Consideration is given to these future improvements as pump stations and lines are sized for the project at hand.

Distribution system improvements, primarily within the WCWD service area, include approximately 49,600 linear feet of 3-inch polyvinyl chloride (PVC), 4-inch ductile iron (DI), 6-inch PVC, and 6-inch DI water mains with appurtenances to serve approximately 25 new customers in areas throughout Carroll, Henry, and Trimble Counties.

Additionally, the project includes a 40-gpm booster pump station on Kings Ridge Road, 60-gpm booster pump station on Gilgal Road, and appurtenances. The Kings Ridge Road booster pump station will fill the existing Bells Ridge Tank while the new Gilgal Road booster pump station will fill the existing Gilgal Tank.

The project goal is to provide potable water to currently unserved areas, as well as replacing some existing mains and possibly adding a new transmission main. The following new line extensions, transmission main and pump stations were analyzed for viability:

1. Painter's Ridge Road
2. Miller's Branch Road
3. Hardy Creek Road
4. R. D. Kendall Road
5. Nora (Smith) Lane
6. Mound Hill Road
7. Turkey Run Road
8. New transmission main to serve General Butler Storage Tank.
9. Line replacement on Gilgal Road.
10. Two new booster pump stations–Gilgal Road and Kings Ridge.
11. New supervisory control and data acquisition (SCADA) on the new booster stations and the tanks they fill to give the ability to turn on/off the booster pumps based on tank elevations.

Figure 9 shows a map of these improvements. Table 10 provides a summary of the water mains in the project. The columns labeled "Name" and "Main Size/Road" refer to the proposed mains. The column "Supply Main Size/Road" refers to the water main feeding the proposed main. The supply mains will either be another proposed main or an existing main. The "Supply Pump" column refers to the pump that is either on the suction or discharge side of the proposed main, which will affect pressures in the main.

Legend

- Proposed PS
- Proposed Improvements
- Existing PS
- Existing WTP

Existing Tanks

- WCWD Tank
- CU Tank
- CCWD#1 Tank
- Other Tanks

- Interstate
- US HWY
- KY HWY
- Local Road
- Water Lines

Utility Service Boundaries

- WCWD Boundary
- CU Boundary
- CCWD#1 Boundary

0 1 2 4 Miles

N

CCWD#1 Gallatin WTP

CCWD#1 Ghent WTP

Ghent

Milton

Kings Ridge Extension and Pump Station

Painter's Ridge Extension

CU WTP

General Butler 0.7 MG 721 OF EL

0.3 MG

Culls Ridge 0.1 MG 1030 OF EL

Mound Hill 0.15 MG 999 OF EL

Carrollton

0.25 MG

Carroll Co.

Mound Hill Extension

Bells Ridge 0.1 MG 1075 OF EL

R.D. Kendall Extension

Trimble Co.

Miller's Branch Extension

Gilgal 0.05 MG 976 OF EL

Worthville

Nora Lane Extension

Trimble Co. WD#1 Wises Landing WTP

Bedford

Hardy Creek Extension

Gigal Extension and Booster Station

Trimble Co. WD#1 Brays WTP

Turkey Run Extension

Henry Co.

42 421 71

DISTRIBUTION SYSTEM IMPROVEMENTS

WTP AND DISTRIBUTION SYSTEM IMPROVEMENTS PER CARROLLTON UTILITIES

CARROLLTON, KENTUCKY

STRAND ASSOCIATES

FIGURE 9
5104.002

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"High Ground Elevation" is the highest elevation that will be served by the main either on the road or the area surrounding it. "Minimum Pressure" is the lowest expected pressure that will be provided in the vicinity of the proposed main.

TABLE 10

SUMMARY OF WATER MAIN ADDITIONS

Name	Main Size/Road	Supply Main Size/Road	Supply Tank/Overflow Elevation	Supply Pump	High Ground Elevation (feet)	Minimum Pressure* (psi)
A	3-inch water main Painter's Ridge Road	3-inch water main Wrights Ridge Road	Bells Ridge Tank 1,075 feet	N/A	875	38
B	3-inch water main RD Kendall Road	3-inch water main RD Kendall Road	Bells Ridge Tank 1,075 feet	N/A	890	48
C	3-inch water main Miller's Branch	3-inch water main Miller's Branch	Bells Ridge Tank 1,075 feet	N/A	590	200
D	3-inch water main Hardy Creek	3-inch water main Hardy Creek	Bells Ridge Tank 1,075 feet	N/A	570	172
E	6-inch water main US 42/KY 36/Kings Ridge Road	6-inch water main US 42/KY 36	General Butler Tank 721 feet	Proposed Kings Ridge Pump Station	815	50
F	3-inch water main Mound Hill Road	6-inch water main Mound Hill Road	Mound Hill Tank 999 feet	N/A	880	43
G	4-inch water main Gilgal Road	3-inch water main Gilgal Road	Carroll Utilities MM–73 psi Minimum at Tie-in Location or 688 feet	Proposed Gilgal Road PS	850	60
H	3-inch water main Nora Lane	3-inch water main English Road	Gilgal Tank 976 feet	N/A	880	30

* Minimum pressure calculations based on tank down 10 feet and peak demand headloss.

B. WCWD Line Extensions and Mains

The hydraulic analysis on each proposed improvement is included in Appendix B. This analysis considered the existing tank serving each main, the characteristics of the existing mains, and the users. The hydraulic grade line (HGL) was based on the tank overflow elevation and the assumption that the water level is ten feet below the overflow. The HGL reflects the head loss generated throughout the existing and proposed mains because of the usage in the main.

Projected peak water usage was based on recent historical data concerning existing customers of the water supply system. Peak water usage was based on D.R. Taylor curve, or the square root of the total number of users times 10. This usage was included in the analysis.

According to Ten State Standards 8.1.6b, all dead-end mains shall provide 2.5 feet per second (fps) flushing velocity. The design of all mains should maintain the required 30 psi to all customers on this extension and 20 psi when flushing. Lines A, E, F, and G should maintain the required 20 psi when flushing at the low point on the main. Line H will need a mechanical form of cleaning since a 2.5 fps flushing velocity likely cannot be maintained.

During the completion of the hydraulic analysis, insufficient pressure and flushing velocity was identified on the Turkey Run Road line extension. The extension could not be served by the existing tank through the proposed main without the use of a new booster station. The anticipated shortfall in pressure and velocity is because of the existing elevation in portions of the proposed extension compared to the projected HGL in this area. Details of the analysis are provided in Appendix B.

Based on this information, the Turkey Run Road line extension was eliminated from the project. The area could be served in the future with the installation of a line extension supported by a booster pump station.

C. Pump Stations

Kings Ridge Road Pump Station–This station will be an entirely new station where one does not currently exists. The overflow of the General Butler Tank, serving the proposed pump station, is 721 feet mean sea level (MSL), and the overflow of the Bells Ridge tank is 1,075 feet MSL. The ground elevation of the new pump station is approximately 590 feet MSL.

This new pump station should maintain the required 30 psi to all users on both the suction and discharge side based on the ground elevation of the land versus the HGL when the pump station is running (see the hydraulic analysis in Appendix B). The majority of the area should maintain 80 psi except for the locations of the existing tanks and the proposed pump station. This station was sized to maximize the flow rate while simultaneously maintaining line pressures that are within the acceptable range.

The pump station will be served with the existing single-phase power located in the area and converted to three-phase power through VFDs located within the proposed station. The pump station will be equipped with quick connects for a generator should emergency power be needed.

SCADA will be provided that will control the pump station on and off times based on the elevation of water in the Bells Ridge Tank.

The pumps for this station are rated for 40 gpm at 470 feet of total dynamic head (TDH) based on preliminary hydraulic calculations. The size of these pumps were limited because of the existing large amount of 3-inch mains located in the existing system that incurred a lot of head loss that required more TDH to overcome that increased the pressure on the discharge side of the booster station.

Gilgal Road Pump Station–This station is replacing an existing aged station at the same location. This pump station is being served by CU through a master meter. This existing pump station, as well as the new pump station, will fill the existing Gilgal Tank, which has an overflow of 976 feet MSL. The ground elevation of the new and existing pump station is approximately 520 feet MSL.

This new pump station should maintain the required 30 psi to all users on the discharge side based on the ground elevation of the land versus the HGL when the pump station is running (see the hydraulic analysis in Appendix B). The majority of the area should maintain over 100 psi except for the locations of the existing tank and the proposed pump station.

The pump station will be served with the existing single-phase power located in the area and converted to three-phase power through VFDs located within the proposed station. The pump station will be equipped with quick connects for a generator if emergency power is needed.

SCADA will be provided that will control the pump station On and Off times based on the elevation of water in the Gilgal Tank.

The pumps for this station are rated for 60 gpm at 310 feet of TDH based on preliminary hydraulic calculations. Piping on the discharge side of the proposed pump station is being upgraded to a 4-inch main to reduce headloss and pressure on the discharge sides of the pumps.

D. CU Transmission Main

The original proposed improvements included a new transmission main from 6th Street to Gillock Avenue to serve the side-by-side storage tanks located in General Butler State Park. The new main was initially proposed to increase the volume of water transmitted to the tanks, thereby reducing the amount of time required to fill the tanks. This objective supported the goal of reducing the operation time of the WTP. Subsequent treatment process changes at the WTP and the hydraulic analysis of the existing and proposed transmission mains revealed minimal benefits of a new transmission main.

Strand Associates, Inc.® (Strand) utilized an existing EPANET model provided by CU to analyze the proposed transmission line; the results of which are included in Appendix C. Under existing conditions, the maximum pressure using one high service pump is approximately 121 psi in the system and it takes approximately 13 hours to fill the General Butler tanks. Under existing conditions, the maximum pressure using two high service pumps for the existing system is approximately 137 psi and it takes about 5 hours to fill the General Butler tanks.

Strand evaluated three improvement scenarios, described below, to assess the time to fill the tanks without over pressurizing the existing system. The EPANET modeling results and scenarios are included in Appendix C.

1. Scenario 1 considers a new 8-inch main parallel with the existing 8-inch main on 6th Street to Gillock Avenue with both high service pumps running. The maximum pressure would be about 127 psi and it would take approximately 3.5 hours to fill the tank. The cost opinion for approximately 5,200 linear feet of 8-inch ductile iron pipe mainly in the roadway would be approximately $208,000.

2. Scenario 2 indicates when a new 10-inch main is paralleled with the existing main 8-inch main on 6th Street to Gillock Avenue and both high service pumps are running. The maximum pressure is about 124 psi and it takes approximately 3 hours to fill the tank. The cost opinion for approximately 5,200 linear feet of 10-inch ductile iron pipe mainly in the roadway would be approximately $260,000.

3. Scenario 3 accounts for a 12-inch main parallel with the existing 8-inch main on 6th Street to Gillock Avenue and both high service pumps running. The maximum pressure would be about 121 psi and would take approximately 3 hours to fill the tank. The cost opinion for approximately 5,200 linear feet of 12-inch ductile iron pipe mainly in the roadway would be approximately $312,000.

Another alternative might include using one large pump instead of two smaller pumps. However, this alternative would increase pressure in the existing system.

Based on these results, it appears all three scenarios produce minimal benefit, especially when costs-to-benefit ratios are considered. Therefore, a new transmission main to serve the General Butler Storage Tanks is not warranted at this time and has been removed from the project.

E. Proposed Construction Cost Opinion

The proposed construction cost opinion of these improvements, without the Turkey Run Road extension and the General Butler Tank transmission main, is approximately $762,760, not including contingencies.

Appendix D provides a detailed table showing the proposed construction cost opinion.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the analysis and evaluation described in the previous sections of this report, discussions with utility staff and management, preliminary discussions with KDOW, the resulting recommendations from Strand, and the selection of those recommendations by CU and WCWD:

A. WTP

1. Install a 1.5 mgd ion exchange softening treatment plant with the following features as indicated in Alternative 2.

    a. Three ion exchange units each being a 8.5-foot-diameter tank. (Remove the existing caustic soda tanks and containment walls).

    b. Two brine storage tanks with two brine feed pumps

    c. Selection of the type of salt will be made during the final design phase based primarily on:

        (1) Cost-benefit ratio of the cost versus additional manpower associated with each.

        (2) CU's desire to potentially use the salt for future hypochlorite production.

2. Acquire the property immediately adjacent to the rear of the existing WTP building, if possible, to accommodate the brine storage tanks and to provide access to them. An alternative location for these tanks is immediately behind the WTP building near the air stripper towers.

3. Perform a geotechnical investigation on the brine storage tank site.

4. Install one additional low lift VFD driven pump. Leave the existing low lift pump in place (further detailed analysis will be completed in final design to confirm the existing pump can be utilized). Plumb both pumps such that either one can be used with either the ion exchange process or the lime softening process.

5. Utilize existing spaces in the motor control center for circuit breakers or motor starters. VFDs will likely require remote mounting, which will be determined during final design.

6. Install a new sewer line from the WTP to a nearby sanitary manhole to receive backwash from the ion exchange units.

7. Construct an interior manhole or sump to be used to convey backwash water to the new sewer.

8. Maintain the existing lime-softening treatment plant without any changes or improvements incorporated into this project (CU may benefit from extensive maintenance once the new ion exchange process is online.)

9. Maintain two of the existing lime sludge ponds near 2nd Street.

10. Request a 1.5 mgd rating for the ion exchange process (independent of the lime softening process) and a corresponding Class III B rating from KDOW.

11. Percent of water treated by the ion exchange process will need to be balanced based on raw water quality and desired finished water levels of iron, manganese, sodium and hardness.

B. Distribution System Improvements

1. Proceed with line extensions, as described in this report, except for the removal of the Turkey Run Road extension, which will be removed from this project.

2. Install two booster pump stations: at Kings Ridge Road and at Gilgal Road, as described.

3. Utilize single-phase electrical service at each pump station, which will be converted to three-phase electrical service through the VFDs.

4. Install quick-connects for generator connections.

5. Remove the transmission main from 6th Street to Gillock Avenue from this project.

The improvements discussed in this report will likely provide CU with cost-effective infrastructure for its existing customers and establish a plan to serve future community growth.

APPENDIX A
WATER QUALITY DATA

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:
Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050158
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-152	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Benzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Carbon Tetrachloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,4-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,cis	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,trans	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methylene Chloride (Dichloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Ethylbenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Styrene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Tetrachloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Toluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,4-Trichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Trichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Vinyl Chloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total Xylenes	<1.0	ug/L	THB	1.0	EPA 524.2	5/3/2012
Bromobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

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CARROLLTON, KY 41008

Order No.: 2012050158
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-152	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Methyl Chloride (Chloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
4-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlororopane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloropropylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total 1,3-Dichloropropene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,3-Trichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Dibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromodichloromethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromoform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorodibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methyl-Tert-Butyl Ether (MTBE)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-153	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Arsenic, Total Rec.-(GFAA)	0.0006	mg/L	HW	0.0006	EPA 200.9	5/8/2012
Antimony, Total Rec.-(GFAA)	<0.0004	mg/L	HW	0.0004	EPA 200.9	5/8/2012
Cadmium, Total Rec.-(GFAA)	<0.0002	mg/L	HW	0.0002	EPA 200.9	5/9/2012
Selenium, Total Rec.-(GFAA)	<0.0008	mg/L	HW	0.0008	EPA 200.9	5/9/2012
Thallium, Total Rec.-(GFAA)	<0.0005	mg/L	HW	0.0005	EPA 200.9	5/9/2012
Mercury, Total Rec.-(CVAA)	<0.0001	mg/L	LE	0.0001	SM-3112B	5/16/2012
Barium, Total Rec.-(ICP)	0.171	mg/L	HW	0.08	EPA 200.7	5/4/2012
Beryllium, Total Rec.-(ICP)	<0.0005	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Chromium, Total Rec.-(ICP)	<0.001	mg/L	HW	0.001	EPA 200.7	5/4/2012
Nickel, Total Rec.-(ICP)	<0.001	mg/L	HW	0.001	EPA 200.7	5/4/2012
Sodium, Total Rec.-(ICP)	28.37	mg/L	HW	0.2	EPA 200.7	5/4/2012
Hardness, Total- as CaCO3	439.4	mg/L	HW	1.0	SM-2340B	5/4/2012

Comments:

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Order No.: 2012050158
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Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-154	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Cyanide, Free (DW)	<0.005	mg/L	RH	0.005	SM-4500CN-G & E	5/11/2012

Comments:

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Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-155	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Fluoride,Adjusted	0.09	mg/L	PJ	0.02	EPA 300.1	5/4/2012
Nitrate (as N)	4.97	mg/L	PJ	0.05	EPA 300.1	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050158
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Report Date: 05/24/2012

Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P05-180	Drinking Water	WPA		5/3/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Iron Related Bacteria		25.000	CFU/mL	FO	10	BART	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050158
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Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-182	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Aluminum, Total-(ICP)	<0.016	mg/L	HW	0.016	EPA 200.7	5/4/2012
Copper, Total Rec.-(ICP)	<0.002	mg/L	HW	0.002	EPA 200.7	5/4/2012
Iron, Total Rec.-(ICP)	0.193	mg/L	HW	0.005	EPA 200.7	5/4/2012
Silver, Total Rec.-(ICP)	<0.003	mg/L	HW	0.003	EPA 200.7	5/4/2012
Zinc, Total Rec.-(ICP)	0.0069	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Manganese, Total Rec.-(ICP)	0.119	mg/L	HW	0.003	EPA 200.7	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050158
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Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-183	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Nitrate (as N)	4.95	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Nitrite (as N)	<0.05	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Sulfate	51.174	mg/L	PJ	1.0	EPA 300.1	5/4/2012
Chloride	62.95	mg/L	PJ	2.0	EPA 300.1	5/4/2012
Fluoride,Adjusted	0.09	mg/L	PJ	0.02	EPA 300.1	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050158
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Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-184	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Color	<1	PC Units	THB	1	SM-2120B	5/3/2012

Comments:

Report of Laboratory Analysis

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P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050158
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-185	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Odor Threshold	<1.0	T.O.N.	THB	1.0	SM-2150B	5/3/2012

Comments:

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CARROLLTON, KY 41008

Order No.: 2012050158
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-186	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Surfactants (Foaming Agents)	<0.02	mg MBAS/L	THB	0.02	SM-5540C	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050158
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-187	Drinking Water	WPA	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Hardness-(Ca)- as CaCO3	289.5	mg/L	HW	1.0	SM-2340B	5/10/2012
Alkalinity, Total	351.0	mg CaCO3/L	RH	2.0	SM-2320B	5/7/2012
pH	7.27	S.U.	PJ	0.10	SM-4500H+B	5/4/2012
Solids, Dissolved Total	616.7	mg/L	LE	1.0	SM-2540C	5/8/2012
Corrosivity, (Langelier Index)	0.41	Calculation	WW		SM-2330B	5/23/2012
Carbonate	351.0	mg CaCO3/L	RH	2.0	SM-2320B	5/11/2012
Hardness-(Mg)- as CaCO3	144.7	mg/L	HW	1.0	SM-2340B	5/10/2012

Comments: Temp@20C was used in the corrosivity calculation.

Report of Laboratory Analysis

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Order No.: 2012050158
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Date Received: 05/03/2012
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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-151	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Alachlor	<0.44	ug/L	WW	0.44	EPA 525.2	5/23/2012
Atrazine	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Benzo(a)pyrene	<0.044	ug/L	WW	0.044	EPA 525.2	5/23/2012
Di(2-ethylhexyl)adipate	<1.32	ug/L	WW	1.32	EPA 525.2	5/23/2012
Di(2-ethylhexyl)phthalate	<1.32	ug/L	WW	1.32	EPA 525.2	5/23/2012
Hexachloropentadiene	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Methoxychlor	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Simazine	<0.154	ug/L	WW	0.154	EPA 525.2	5/23/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 525.2	5/3/2012
Aldicarb	<1.1	ug/L	HW	1.1	EPA 531.1	5/8/2012
Aldicarb Sulfone	<1.4	ug/L	HW	1.4	EPA 531.1	5/8/2012
Aldicarb Sulfoxide	<1.0	ug/L	HW	1.0	EPA 531.1	5/8/2012
Carbofuran	<1.98	ug/L	HW	1.98	EPA 531.1	5/8/2012
Oxamyl (Vydate)	<4.4	ug/L	HW	4.4	EPA 531.1	5/8/2012
Sample Preparation-Filtration	DONE		HW		EPA 531.1	5/8/2012
Chlordane (total)	<0.44	ug/L	WW	0.44	EPA 508.1	5/17/2012
Endrin	<0.022	ug/L	WW	0.022	EPA 508.1	5/17/2012
Heptachlor	<0.088	ug/L	WW	0.088	EPA 508.1	5/17/2012
Heptachlor Epoxide	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Hexachlorobenzene	<0.22	ug/L	WW	0.22	EPA 508.1	5/17/2012
Lindane	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Toxaphene	<2.2	ug/L	WW	2.2	EPA 508.1	5/17/2012
Sample Preparation-SPE Extraction	DONE		HW		EPA 508.1	5/4/2012
Dalapon	<2.2	ug/L	HW	2.2	EPA 552.2	5/8/2012

Report of Laboratory Analysis

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Order No.: 2012050158
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Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-151	Drinking Water	WPA	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Sample Preparation-LL Extraction	DONE		HW		EPA 552.2	5/4/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 515.2	5/9/2012
DBCP	<0.044	ug/L	WW	0.044	EPA 504.1	5/11/2012
EDB	<0.022	ug/L	WW	0.022	EPA 504.1	5/11/2012
Sample Preparation-LL Extraction	DONE		HW		EPA 504.1	5/11/2012
Diquat	<0.88	ug/L	WW	0.88	EPA 549.2	5/8/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 549.2	5/3/2012
Endothall	<19.8	ug/L	WW	19.8	EPA 548.1	5/10/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 548.1	5/8/2012

Comments:

Approved by: _____
Whitney Wu, Lab Manager

Report of Laboratory Analysis

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Order No.: 2012050159
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-194	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Benzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Carbon Tetrachloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,4-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,cis	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,trans	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methylene Chloride (Dichloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Ethylbenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Styrene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Tetrachloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Toluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,4-Trichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Trichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Vinyl Chloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total Xylenes	<1.0	ug/L	THB	1.0	EPA 524.2	5/3/2012
Bromobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No : 2012050159
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-194	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Methyl Chloride (Chloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
4-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlororopane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloropropylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total 1,3-Dichloropropene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,3-Trichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Dibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromodichloromethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromoform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorodibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methyl-Tert-Butyl Ether (MTBE)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050159
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Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-162	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Arsenic, Total Rec.-(GFAA)	<0.0006	mg/L	HW	0.0006	EPA 200.9	5/8/2012
Antimony, Total Rec.-(GFAA)	<0.0004	mg/L	HW	0.0004	EPA 200.9	5/8/2012
Cadmium, Total Rec.-(GFAA)	<0.0002	mg/L	HW	0.0002	EPA 200.9	5/9/2012
Selenium, Total Rec.-(GFAA)	<0.0008	mg/L	HW	0.0008	EPA 200.9	5/9/2012
Thallium, Total Rec.-(GFAA)	<0.0005	mg/L	HW	0.0005	EPA 200.9	5/9/2012
Mercury, Total Rec.-(CVAA)	<0.0001	mg/L	LE	0.0001	SM-3112B	5/16/2012
Barium, Total Rec.-(ICP)	0.084	mg/L	HW	0.08	EPA 200.7	5/4/2012
Beryllium, Total Rec.-(ICP)	<0.0005	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Chromium, Total Rec.-(ICP)	<0.001	mg/L	HW	0.001	EPA 200.7	5/4/2012
Nickel, Total Rec.-(ICP)	0.006	mg/L	HW	0.001	EPA 200.7	5/4/2012
Sodium, Total Rec.-(ICP)	23.26	mg/L	HW	0.2	EPA 200.7	5/4/2012
Hardness, Total- as CaCO3	434.1	mg/L	HW	1.0	SM-2340B	5/4/2012

Comments:

Report of Laboratory Analysis

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-163	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Cyanide, Free (DW)	<0.005	mg/L	RH	0.005	SM-4500CN-G & E	5/11/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-164	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Fluoride,Adjusted	0.088	mg/L	PJ	0.02	EPA 300.1	5/4/2012
Nitrate (as N)	4.668	mg/L	PJ	0.05	EPA 300.1	5/4/2012

Comments:

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Order No.: 2012050159
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Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P05-178	Drinking Water	WPB		5/3/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Iron Related Bacteria		<10	CFU/mL	FO	10	BART	5/4/2012

Comments:

Report of Laboratory Analysis

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Order No.: 2012050159
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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-156	Drinking Water	WPB	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Aluminum, Total-(ICP)	<0.016	mg/L	HW	0.016	EPA 200.7	5/4/2012
Copper, Total Rec.-(ICP)	0.009	mg/L	HW	0.002	EPA 200.7	5/4/2012
Iron, Total Rec.-(ICP)	0.184	mg/L	HW	0.005	EPA 200.7	5/4/2012
Silver, Total Rec.-(ICP)	<0.003	mg/L	HW	0.003	EPA 200.7	5/4/2012
Zinc, Total Rec.-(ICP)	0.0282	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Manganese, Total Rec.-(ICP)	0.113	mg/L	HW	0.003	EPA 200.7	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-157	Drinking Water	WPB	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Nitrate (as N)	4.52	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Nitrite (as N)	<0.05	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Sulfate	46.643	mg/L	PJ	1.0	EPA 300.1	5/4/2012
Chloride	58.401	mg/L	PJ	2.0	EPA 300.1	5/4/2012
Fluoride,Adjusted	0.095	mg/L	PJ	0.02	EPA 300.1	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-158	Drinking Water	WPB	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Color	<1	PC Units	THB	1	SM-2120B	5/3/2012

Comments:

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Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P05-159	Drinking Water	WPB		5/3/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Odor Threshold		<1.0	T.O.N.	THB	1.0	SM-2150B	5/3/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-160	Drinking Water	WPB	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Surfactants (Foaming Agents)	<0.02	mg MBAS/L	THB	0.02	SM-5540C	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-161	Drinking Water	WPB	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Hardness-(Ca)- as CaCO3	283.2	mg/L	HW	1.0	SM-2340B	5/10/2012
Alkalinity, Total	338.0	mg CaCO3/L	RH	2.0	SM-2320B	5/7/2012
pH	7.49	S.U.	PJ	0.10	SM-4500H+B	5/4/2012
Solids, Dissolved Total	543.3	mg/L	LE	1.0	SM-2540C	5/8/2012
Corrosivity, (Langelier Index)	0.61	Calculation	WW		SM-2330B	5/23/2012
Carbonate	337.0	mg CaCO3/L	RH	2.0	SM-2320B	5/11/2012

Comments: Temp@20C was used in the corrosivity calculation.

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Order No.: 2012050159
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Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-149	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Alachlor	<0.44	ug/L	WW	0.44	EPA 525.2	5/22/2012
Atrazine	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Benzo(a)pyrene	<0.044	ug/L	WW	0.044	EPA 525.2	5/22/2012
Di(2-ethylhexyl)adipate	<1.32	ug/L	WW	1.32	EPA 525.2	5/22/2012
Di(2-ethylhexyl)phthalate	<1.32	ug/L	WW	1.32	EPA 525.2	5/22/2012
Hexachloropentadiene	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Methoxychlor	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Simazine	<0.154	ug/L	WW	0.154	EPA 525.2	5/22/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 525.2	5/3/2012
Aldicarb	<1.1	ug/L	HW	1.1	EPA 531.1	5/8/2012
Aldicarb Sulfone	<1.4	ug/L	HW	1.4	EPA 531.1	5/8/2012
Aldicarb Sulfoxide	<1.0	ug/L	HW	1.0	EPA 531.1	5/8/2012
Carbofuran	<1.98	ug/L	HW	1.98	EPA 531.1	5/8/2012
Oxamyl (Vydate)	<4.4	ug/L	HW	4.4	EPA 531.1	5/8/2012
Sample Preparation-Filtration	DONE		HW		EPA 531.1	5/8/2012
Chlordane (total)	<0.44	ug/L	WW	0.44	EPA 508.1	5/17/2012
Endrin	<0.022	ug/L	WW	0.022	EPA 508.1	5/17/2012
Heptachlor	<0.088	ug/L	WW	0.088	EPA 508.1	5/17/2012
Heptachlor Epoxide	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Hexachlorobenzene	<0.22	ug/L	WW	0.22	EPA 508.1	5/17/2012
Lindane	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Toxaphene	<2.2	ug/L	WW	2.2	EPA 508.1	5/17/2012
Sample Preparation-SPE Extraction	DONE		HW		EPA 508.1	5/4/2012
Dalapon	<2.2	ug/L	HW	2.2	EPA 552.2	5/8/2012

Report of Laboratory Analysis

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P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050159
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-149	Drinking Water	WPB	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Sample Preparation-LL Extraction	DONE		HW		EPA 552.2	5/4/2012
DBCP	<0.044	ug/L	WW	0.044	EPA 504.1	5/11/2012
EDB	<0.022	ug/L	WW	0.022	EPA 504.1	5/11/2012
Sample Preparation-LL Extraction	DONE		HW		EPA 504.1	5/11/2012
Diquat	<0.88	ug/L	WW	0.88	EPA 549.2	5/8/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 549.2	5/3/2012
Endothall	<19.8	ug/L	WW	19.8	EPA 548.1	5/10/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 548.1	5/8/2012

Comments:

Approved by:

Whitney Wu, Lab Manager

Report of Laboratory Analysis

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Order No.: 2012050160
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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-195	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Benzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Carbon Tetrachloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,4-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,cis	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,trans	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methylene Chloride (Dichloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Ethylbenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Styrene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Tetrachloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Toluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,4-Trichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Trichloroethylene	3.03	ug/L	THB	0.5	EPA 524.2	5/3/2012
Vinyl Chloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total Xylenes	<1.0	ug/L	THB	1.0	EPA 524.2	5/3/2012
Bromobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Report of Laboratory Analysis

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-195	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Methyl Chloride (Chloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
4-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlororopane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloropropylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total 1,3-Dichloropropene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,3-Trichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Dibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromodichloromethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromoform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorodibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methyl-Tert-Butyl Ether (MTBE)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Comments:

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Order No.: 2012050160
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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-168	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Arsenic, Total Rec.-(GFAA)	0.0008	mg/L	HW	0.0006	EPA 200.9	5/8/2012
Antimony, Total Rec.-(GFAA)	<0.0004	mg/L	HW	0.0004	EPA 200.9	5/8/2012
Cadmium, Total Rec.-(GFAA)	<0.0002	mg/L	HW	0.0002	EPA 200.9	5/9/2012
Selenium, Total Rec.-(GFAA)	<0.0008	mg/L	HW	0.0008	EPA 200.9	5/9/2012
Thallium, Total Rec.-(GFAA)	<0.0005	mg/L	HW	0.0005	EPA 200.9	5/9/2012
Mercury, Total Rec.-(CVAA)	<0.0001	mg/L	LE	0.0001	SM-3112B	5/16/2012
Barium, Total Rec.-(ICP)	0.117	mg/L	HW	0.08	EPA 200.7	5/4/2012
Beryllium, Total Rec.-(ICP)	<0.0005	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Chromium, Total Rec.-(ICP)	<0.001	mg/L	HW	0.001	EPA 200.7	5/4/2012
Nickel, Total Rec.-(ICP)	0.007	mg/L	HW	0.001	EPA 200.7	5/4/2012
Sodium, Total Rec.-(ICP)	20.71	mg/L	HW	0.2	EPA 200.7	5/4/2012
Hardness, Total- as CaCO3	398.0	mg/L	HW	1.0	SM-2340B	5/4/2012

Comments:

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050160
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P05-170	Drinking Water	WPC		5/2/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Cyanide, Free (DW)		<0.005	mg/L	RH	0.005	SM-4500CN-G & E	5/11/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-169	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Fluoride,Adjusted	0.104	mg/L	PJ	0.02	EPA 300.1	5/4/2012
Nitrate (as N)	2.73	mg/L	PJ	0.05	EPA 300.1	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-177	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Iron Related Bacteria	500.000	CFU/mL	FO	10	BART	5/4/2012

Comments:

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Order No.: 2012050160
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Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-171	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Aluminum, Total-(ICP)	<0.016	mg/L	HW	0.016	EPA 200.7	5/4/2012
Copper, Total Rec.-(ICP)	0.039	mg/L	HW	0.002	EPA 200.7	5/4/2012
Iron, Total Rec.-(ICP)	0.601	mg/L	HW	0.005	EPA 200.7	5/4/2012
Silver, Total Rec.-(ICP)	<0.003	mg/L	HW	0.003	EPA 200.7	5/4/2012
Zinc, Total Rec.-(ICP)	0.151	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Manganese, Total Rec.-(ICP)	0.134	mg/L	HW	0.003	EPA 200.7	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-172	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Nitrate (as N)	2.726	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Nitrite (as N)	<0.05	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Sulfate	45.546	mg/L	PJ	1.0	EPA 300.1	5/4/2012
Chloride	45.574	mg/L	PJ	2.0	EPA 300.1	5/4/2012
Fluoride,Adjusted	0.102	mg/L	PJ	0.02	EPA 300.1	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-173	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Color	<1	PC Units	THB	1	SM-2120B	5/3/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-174	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Odor Threshold	<1.0	T.O.N.	THB	1.0	SM-2150B	5/3/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-175	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Surfactants (Foaming Agents)	<0.02	mg MBAS/L	THB	0.02	SM-5540C	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-176	Drinking Water	WPC	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Hardness-(Ca)- as CaCO3	271.8	mg/L	HW	1.0	SM-2340B	5/10/2012
Alkalinity, Total	320.0	mg CaCO3/L	RH	2.0	SM-2320B	5/7/2012
pH	7.56	S.U.	PJ	0.10	SM-4500H+B	5/4/2012
Solids, Dissolved Total	510.0	mg/L	LE	1.0	SM-2540C	5/8/2012
Corrosivity, (Langelier Index)	0.64	Calculation	WW		SM-2330B	5/23/2012
Carbonate	320.0	mg CaCO3/L	RH	2.0	SM-2320B	5/11/2012

Comments: Temp@20C was used in the corrosivity calculation.

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-150	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Alachlor	<0.44	ug/L	WW	0.44	EPA 525.2	5/23/2012
Atrazine	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Benzo(a)pyrene	<0.044	ug/L	WW	0.044	EPA 525.2	5/23/2012
Di(2-ethylhexyl)adipate	<1.32	ug/L	WW	1.32	EPA 525.2	5/23/2012
Di(2-ethylhexyl)phthalate	<1.32	ug/L	WW	1.32	EPA 525.2	5/23/2012
Hexachloropentadiene	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Methoxychlor	<0.22	ug/L	WW	0.22	EPA 525.2	5/23/2012
Simazine	<0.154	ug/L	WW	0.154	EPA 525.2	5/23/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 525.2	5/3/2012
Aldicarb	<1.1	ug/L	HW	1.1	EPA 531.1	5/8/2012
Aldicarb Sulfone	<1.4	ug/L	HW	1.4	EPA 531.1	5/8/2012
Aldicarb Sulfoxide	<1.0	ug/L	HW	1.0	EPA 531.1	5/8/2012
Carbofuran	<1.98	ug/L	HW	1.98	EPA 531.1	5/8/2012
Oxamyl (Vydate)	<4.4	ug/L	HW	4.4	EPA 531.1	5/8/2012
Sample Preparation-Filtration	DONE		HW		EPA 531.1	5/8/2012
Chlordane (total)	<0.44	ug/L	WW	0.44	EPA 508.1	5/17/2012
Endrin	<0.022	ug/L	WW	0.022	EPA 508.1	5/17/2012
Heptachlor	<0.088	ug/L	WW	0.088	EPA 508.1	5/17/2012
Heptachlor Epoxide	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Hexachlorobenzene	<0.22	ug/L	WW	0.22	EPA 508.1	5/17/2012
Lindane	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Toxaphene	<2.2	ug/L	WW	2.2	EPA 508.1	5/17/2012
Sample Preparation-SPE Extraction	DONE		HW		EPA 508.1	5/4/2012
Dalapon	<2.2	ug/L	HW	2.2	EPA 552.2	5/8/2012

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Order No.: 2012050160
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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-150	Drinking Water	WPC	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Sample Preparation-LL Extraction	DONE		HW		EPA 552.2	5/4/2012
2,4,5-TP	<0.44	ug/L	WW	0.44	EPA 515.2	5/18/2012
2,4-D	<0.22	ug/L	WW	0.22	EPA 515.2	5/18/2012
Dinoseb	<0.44	ug/L	WW	0.44	EPA 515.2	5/18/2012
Pentachlorophenol	<0.088	ug/L	WW	0.088	EPA 515.2	5/18/2012
Picloram	<0.22	ug/L	WW	0.22	EPA 515.2	5/18/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 515.2	5/9/2012
DBCP	<0.044	ug/L	WW	0.044	EPA 504.1	5/11/2012
EDB	<0.022	ug/L	WW	0.022	EPA 504.1	5/11/2012
Sample Preparation-LL Extraction	DONE		HW		EPA 504.1	5/11/2012
Diquat	<0.88	ug/L	WW	0.88	EPA 549.2	5/8/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 549.2	5/3/2012
Endothall	<19.8	ug/L	WW	19.8	EPA 548.1	5/10/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 548.1	5/8/2012

Comments:

Approved by: _____
Whitney Wu, Lab Manager

Report of Laboratory Analysis

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Order No.: 2012050161
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Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-196	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Benzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Carbon Tetrachloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,4-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,cis	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloroethylene,trans	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methylene Chloride (Dichloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Ethylbenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Styrene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Tetrachloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Toluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,4-Trichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2-Trichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Trichloroethylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Vinyl Chloride	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total Xylenes	<1.0	ug/L	THB	1.0	EPA 524.2	5/3/2012
Bromobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-196	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Methyl Chloride (Chloromethane)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
4-Chlorotoluene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlorobenzene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,3-Dichlororopane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
2,2-Dichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1-Dichloropropylene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Total 1,3-Dichloropropene	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,1,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,1,2,2-Tetrachloroethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
1,2,3-Trichloropropane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Dibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromodichloromethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Bromoform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chlorodibromomethane	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Chloroform	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012
Methyl-Tert-Butyl Ether (MTBE)	<0.5	ug/L	THB	0.5	EPA 524.2	5/3/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-165	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Arsenic, Total Rec.-(GFAA)	0.0006	mg/L	HW	0.0006	EPA 200.9	5/8/2012
Antimony, Total Rec.-(GFAA)	0.0004	mg/L	HW	0.0004	EPA 200.9	5/8/2012
Cadmium, Total Rec.-(GFAA)	<0.0002	mg/L	HW	0.0002	EPA 200.9	5/9/2012
Selenium, Total Rec.-(GFAA)	<0.0008	mg/L	HW	0.0008	EPA 200.9	5/9/2012
Thallium, Total Rec.-(GFAA)	<0.0005	mg/L	HW	0.0005	EPA 200.9	5/9/2012
Mercury, Total Rec.-(CVAA)	<0.0001	mg/L	LE	0.0001	SM-3112B	5/16/2012
Barium, Total Rec.-(ICP)	0.106	mg/L	HW	0.08	EPA 200.7	5/4/2012
Beryllium, Total Rec.-(ICP)	<0.0005	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Chromium, Total Rec.-(ICP)	<0.001	mg/L	HW	0.001	EPA 200.7	5/4/2012
Nickel, Total Rec.-(ICP)	0.006	mg/L	HW	0.001	EPA 200.7	5/4/2012
Sodium, Total Rec.-(ICP)	21.13	mg/L	HW	0.2	EPA 200.7	5/4/2012
Hardness, Total- as CaCO3	406.9	mg/L	HW	1.0	SM-2340B	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-166	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Cyanide, Free (DW)	<0.005	mg/L	RH	0.005	SM-4500CN-G & E	5/11/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-167	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Fluoride,Adjusted	0.104	mg/L	PJ	0.02	EPA 300.1	5/4/2012
Nitrate (as N)	3.281	mg/L	PJ	0.05	EPA 300.1	5/4/2012

Comments:

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Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-188	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Aluminum, Total-(ICP)	<0.016	mg/L	HW	0.016	EPA 200.7	5/4/2012
Copper, Total Rec.-(ICP)	<0.002	mg/L	HW	0.002	EPA 200.7	5/4/2012
Iron, Total Rec.-(ICP)	0.14	mg/L	HW	0.005	EPA 200.7	5/4/2012
Silver, Total Rec.-(ICP)	<0.003	mg/L	HW	0.003	EPA 200.7	5/4/2012
Zinc, Total Rec.-(ICP)	0.0038	mg/L	HW	0.0005	EPA 200.7	5/4/2012
Manganese, Total Rec.-(ICP)	0.109	mg/L	HW	0.003	EPA 200.7	5/4/2012

Comments:

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-189	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Nitrate (as N)	5.485	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Nitrite (as N)	<0.05	mg/L	PJ	0.05	EPA 300.1	5/4/2012
Sulfate	50.000	mg/L	PJ	1.0	EPA 300.1	5/4/2012
Chloride	61.334	mg/L	PJ	2.0	EPA 300.1	5/4/2012
Fluoride,Adjusted	0.091	mg/L	PJ	0.02	EPA 300.1	5/4/2012

Comments:

Report of Laboratory Analysis

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Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-190	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Color	<1	PC Units	THB	1	SM-2120B	5/3/2012

Comments:

Report of Laboratory Analysis

Environmental Laboratories, Inc.

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Tel: 812.273.6699 Fax: 812.273.5788

Report To:
Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-191	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Odor Threshold	<1.0	T.O.N.	THB	1.0	SM-2150B	5/3/2012

Comments:

Report of Laboratory Analysis

Environmental Laboratories, Inc.

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Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-192	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Surfactants (Foaming Agents)	<0.02	mg MBAS/L	THB	0.02	SM-5540C	5/4/2012

Comments:

Report of Laboratory Analysis

Environmental Laboratories, Inc.

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Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-193	Drinking Water	AERATED WATER	5/3/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Hardness-(Ca)- as CaCO3	286.5	mg/L	HW	1.0	SM-2340B	5/10/2012
Alkalinity, Total	344.0	mg CaCO3/L	RH	2.0	SM-2320B	5/7/2012
pH	8	S.U.	PJ	0.10	SM-4500H+B	5/4/2012
Solids, Dissolved Total	533.3	mg/L	LE	1.0	SM-2540C	5/8/2012
Corrosivity, (Langelier Index)	1.13	Calculation	WW		SM-2330B	5/23/2012
Carbonate	344.0	mg CaCO3/L	RH	2.0	SM-2320B	5/11/2012

Comments: Temp@20C was used in the corrosivity calculation.

Report of Laboratory Analysis

Environmental Laboratories, Inc.

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Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-148	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Alachlor	<0.44	ug/L	WW	0.44	EPA 525.2	5/22/2012
Atrazine	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Benzo(a)pyrene	<0.044	ug/L	WW	0.044	EPA 525.2	5/22/2012
Di(2-ethylhexyl)adipate	<1.32	ug/L	WW	1.32	EPA 525.2	5/22/2012
Di(2-ethylhexyl)phthalate	<1.32	ug/L	WW	1.32	EPA 525.2	5/22/2012
Hexachloropentadiene	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Methoxychlor	<0.22	ug/L	WW	0.22	EPA 525.2	5/22/2012
Simazine	<0.154	ug/L	WW	0.154	EPA 525.2	5/22/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 525.2	5/3/2012
Aldicarb	<1.1	ug/L	HW	1.1	EPA 531.1	5/8/2012
Aldicarb Sulfone	<1.4	ug/L	HW	1.4	EPA 531.1	5/8/2012
Aldicarb Sulfoxide	<1.0	ug/L	HW	1.0	EPA 531.1	5/8/2012
Carbofuran	<1.98	ug/L	HW	1.98	EPA 531.1	5/8/2012
Oxamyl (Vydate)	<4.4	ug/L	HW	4.4	EPA 531.1	5/8/2012
Sample Preparation-Filtration	DONE		HW		EPA 531.1	5/8/2012
Chlordane (total)	<0.44	ug/L	WW	0.44	EPA 508.1	5/17/2012
Endrin	<0.022	ug/L	WW	0.022	EPA 508.1	5/17/2012
Heptachlor	<0.088	ug/L	WW	0.088	EPA 508.1	5/17/2012
Heptachlor Epoxide	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Hexachlorobenzene	<0.22	ug/L	WW	0.22	EPA 508.1	5/17/2012
Lindane	<0.044	ug/L	WW	0.044	EPA 508.1	5/17/2012
Toxaphene	<2.2	ug/L	WW	2.2	EPA 508.1	5/17/2012
Sample Preparation-SPE Extraction	DONE		HW		EPA 508.1	5/4/2012
Dalapon	<2.2	ug/L	HW	2.2	EPA 552.2	5/8/2012

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Corina Beach
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012050161
PO No.:
Date Received: 05/03/2012
Report Date: 05/24/2012

Lab Id	Matrix	Identification	Date Collected	Collected By	Description
P05-148	Drinking Water	AERATED WATER	5/2/2012	FT	

Test Name	Results	Units	Analyst	Detection Limit	Test Method	Analysis Date
Sample Preparation-LL Extraction	DONE		HW		EPA 552.2	5/4/2012
2,4,5-TP	<0.44	ug/L	WW	0.44	EPA 515.2	5/18/2012
2,4-D	<0.22	ug/L	WW	0.22	EPA 515.2	5/18/2012
Dinoseb	<0.44	ug/L	WW	0.44	EPA 515.2	5/18/2012
Pentachlorophenol	<0.088	ug/L	WW	0.088	EPA 515.2	5/18/2012
Picloram	<0.22	ug/L	WW	0.22	EPA 515.2	5/18/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 515.2	5/9/2012
DBCP	<0.044	ug/L	WW	0.044	EPA 504.1	5/11/2012
EDB	<0.022	ug/L	WW	0.022	EPA 504.1	5/11/2012
Sample Preparation-LL Extraction	DONE		HW		EPA 504.1	5/11/2012
Diquat	<0.88	ug/L	WW	0.88	EPA 549.2	5/8/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 549.2	5/3/2012
Endothall	<19.8	ug/L	WW	19.8	EPA 548.1	5/10/2012
Sample Preparation-SPE Extraction	DONE		BD		EPA 548.1	5/8/2012

Comments:

Approved by:

Whitney Wu, Lab Manager

Report of Laboratory Analysis

Environmental Laboratories, Inc.

635 Green Road, PO Box 968, Madison, IN 47250
Tel: 812.273.6699 Fax: 812.273.5788

Report To:

Frank Thieman
CARROLLTON UTILITIES
P.O. BOX 269
CARROLLTON, KY 41008

Order No.: 2012060345
PO No.:
Date Received: 06/11/2012
Report Date: 07/02/2012

Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P06-093	Drinking Water	WELL PUMP C		6/11/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Iron Related Bacteria		<10	CFU/mL	FO	10	BART	6/12/2012
Comments:							

Lab Id	Matrix	Identification		Date Collected	Collected By	Description	
P06-094	Drinking Water	WELL PUMP C		6/11/2012	FT		
Test Name		**Results**	**Units**	**Analyst**	**Detection Limit**	**Test Method**	**Analysis Date**
Sulfur Related Bacteria		<10 .0	CFU/mL	FO	10 .0	BART	6/12/2012
Comments:							

Approved by:

Whitney Wu, Lab Manager

KENTUCKY DIVISION OF WATER

DRINKING WATER BRANCH

2011 MAY -5 AM 11:10

DIVISION OF WATER

MONTHLY OPERATION REPORT (MOR)--ALL WATER SYSTEMS

Revised 01/04/07

MONTH & YEAR (mm/yyyy): 04/2011

Indicate one with "X"

- [ ] SURFACE WATER
- [X] GROUNDWATER
- [ ] PURCHASE/DISTRIBUTE ONLY

DEP Form 4012--Revised 07/2006

PWS ID:	KY0210067 PLANT ID: A	PLANT NAME:	Carrollton Water Treatment Plant
PWS NAME:	Carrollton Utilities	PLANT CLASS: III	DIST. CLASS: II
AGENCY INTEREST (AI):	696	DATE MAILED:	5/5/2011
SOURCE NAME:	Ohio River Alluvial Aquifer	COUNTY:	Carroll

	OPERATOR(S) RESPONSIBLE / IN-CHARGE	CLASS	CERTIFICATION NUMBER
WTP SHIFT 1:	Franklin W. Thieman II	IIIA	19184
WTP SHIFT 2:	Chris Rose	IIIA	19857
WTP SHIFT 3:			
DISTRIBUTION:	Larry Hayes	IID	9662

THIS REPORT MUST BE RECEIVED BY THE DIVISION OF WATER AND APPLICABLE FIELD OFFICE NO LATER THAN 10 DAYS AFTER THE END OF THE MONTH.

TREATMENT PLANTS COMPLETE:

1. DESIGN CAPACITY (gpm):	1040 gpm
2. TYPE OF FILTRATION USED:	Mixed Media
3. DESIGN FILTRATION RATE (gpm/sq. ft.):	Not to exceed 5gpm/sq.ft.
4. PERCENT BACKWASH WATER USED:	3.6
5. DATE FLOCCULATION BASIN(S) LAST CLEANED:	April 20th 2011
6. DATE SETTLING BASIN(S) LAST CLEANED:	Claricone Unit

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. See KRS 224.99-010 and 401 KAR 8:020. (Penalities under this statute and regulation may include fines up to $25,000 per violation or by imprisonment for not more that one year, or both).

Franklin Thieman II — 5/2/2011

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT — DATE

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 04/2011
PAGE 1 OF 11

APPLICABLE TO ALL PLANTS

	RAW WATER TREATED	HOURS PLANT OPERATED	COAGULANT		COAGULANT Polymer		pH ADJUSTMENT CaO Lime Pre		DISINFECTANT Cl2 Chlorine Pre		DISINFECTANT Post	
DAY	GALLONS		LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1	797,000	12.4			191.0	28.7	1778.0	267.5	17.0	2.6		
2	712,000	11.8			178.0	30.0	1794.0	302.1	12.0	2.0		
3	699,000	11.6			175.0	30.0	1705.0	292.5	13.0	2.2		
4	728,000	12.1			182.0	30.0	1513.0	249.2	14.0	2.3		
5	773,000	12.5			186.0	29.2	1563.0	242.4	15.0	2.3		
6	679,000	11.1			167.0	29.5	1408.0	248.6	13.0	2.3		
7	716,000	12.5			188.0	31.5	1588.0	265.9	17.0	2.8		
8	711,000	12.1			182.0	30.7	1452.0	244.9	14.0	2.4		
9	861,000	14.0			211.0	29.4	1680.0	234.0	15.0	2.1		
10	827,000	13.6			205.0	29.7	1700.0	246.5	17.0	2.5		
11	729,000	12.3			185.0	30.4	1538.0	253.0	15.0	2.5		
12	743,000	11.8			176.0	28.7	1652.0	266.6	15.0	2.4		
13	767,000	12.6			190.0	29.7	1764.0	275.8	17.0	2.7		
14	738,000	12.0			181.0	29.4	1644.0	267.1	13.0	2.1		
15	793,000	12.8			192.0	29.0	1728.0	261.3	17.0	2.6		
16	711,000	11.3			170.0	28.7	1525.0	257.2	24.0	4.0		
17	773,000	12.7			191.0	29.6	1740.0	269.9	10.0	1.6		
18	802,000	12.8			193.0	28.9	1754.0	262.2	16.0	2.4		
19	759,000	12.1			182.0	28.8	1658.0	261.9	14.0	2.2		
20	779,000	14.5			219.0	33.7	1740.0	267.8	16.0	2.5		
21	861,000	14.0			211.0	29.4	1820.0	253.5	18.0	2.5		
22	788,000	12.7			191.0	29.1	1740.0	264.8	15.0	2.3		
23	769,000	12.1			182.0	28.4	1718.0	267.9	18.0	2.8		
24	777,000	11.5			173.0	26.7	1633.0	252.0	17.0	2.6		
25	761,000	12.2			184.0	29.0	1732.0	272.9	20.0	3.2		
26	806,000	13.1			197.0	29.3	2056.0	305.9	16.0	2.4		
27	774,000	12.6			190.0	29.4	2041.0	316.2	16.0	2.5		
28	726,000	11.5			173.0	28.6	1863.0	307.7	16.0	2.6		
29	804,000	13.1			197.0	29.4	2122.0	316.5	15.0	2.2		
30	808,000	12.0			180.0	26.7	1944.0	289.5	17.0	2.5		
31												
TOTAL	22,971,000		0.0		5626.0		51593.0		472.0		0.0	
AVERAGE	765,700		#DIV/0!	#DIV/0!	187.5	29.4	1719.8	269.4	15.7	2.5	#DIV/0!	#DIV/0!
MAX	861,000											

NUMBER DAYS IN OPERATION 30

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 04/2011

APPLICABLE TO ALL PLANTS

	CHEMICALS ADDED													
	DISINFECTANT		FLUORIDE		CARBON		pH ADJUSTMENT Post		$KMnO_4$		CORROSION INHIBITOR			
DAY	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1			7.8	1.2										
2			7.4	1.2										
3			7.6	1.3										
4			7.6	1.3										
5			7.6	1.2										
6			7.6	1.3										
7			8.5	1.4										
8			8.7	1.5										
9			9.7	1.3										
10			9.7	1.4										
11			8.5	1.4										
12			8.1	1.3										
13			7.6	1.2										
14			8.1	1.3										
15			8.5	1.3										
16			7.6	1.3										
17			8.1	1.2										
18			8.5	1.3										
19			7.8	1.2										
20			9.0	1.4										
21			7.6	1.1										
22			7.6	1.2										
23			7.8	1.2										
24			8.1	1.2										
25			7.6	1.2										
26			8.5	1.3										
27			8.1	1.2										
28			7.1	1.2										
29			7.4	1.1										
30			7.4	1.1										
31														
TOTAL	0.0		241.0		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	8.0	1.3	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 04/2011

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

DAY	pH RAW	pH TOP OF FILTER	pH TAP	TOTAL ALKALINITY RAW	TOTAL ALKALINITY TAP	TOTAL HARDNESS RAW	TOTAL HARDNESS TAP	CHLORINE RESIDUAL TOP OF FILTER TOTAL	CHLORINE RESIDUAL TOP OF FILTER FREE	CHLORINE RESIDUAL PLANT TAP TOTAL	CHLORINE RESIDUAL PLANT TAP FREE	TURBIDITY (NTU) RAW	TURBIDITY (NTU) SETTLED WATER	TURBIDITY (NTU) PLANT TAP
1	6.80	8.10	7.70				182				1.30	0.07		0.06
2	6.80	8.20	7.50				192				1.30	0.05		0.06
3	6.80	8.10	7.60				190				1.30	0.06		0.05
4	6.90	8.10	7.60		70	360	188				1.30	0.07		0.05
5	6.80	8.00	7.50				184				1.10	0.06		0.06
6	6.80	8.20	7.60				180				1.40	0.09		0.07
7	6.80	8.10	7.60				172				1.40	0.07		0.05
8	6.90	8.30	7.60				180				1.20	0.08		0.06
9	6.90	8.10	7.80				188				1.40	0.08		0.09
10	6.80	8.10	7.60				182				1.30	0.10		0.10
11	6.90	8.00	7.70		76	410	184				1.20	0.08		0.08
12	6.80	8.20	7.60				188				1.20	0.07		0.08
13	6.90	8.10	7.50				194				1.20	0.08		0.08
14	6.90	8.10	7.60				176				1.20	0.10		0.07
15	6.90	8.10	7.50				176				1.30	0.10		0.06
16	6.90	8.10	7.70				182				1.20	0.08		0.06
17	6.80	8.10	7.60				180				1.30	0.08		0.07
18	6.90	8.10	7.50		80	446	174				1.40	0.08		0.06
19	6.80	8.10	7.50				176				1.30	0.07		0.05
20	6.80	8.20	7.40				218				1.10	0.10		0.08
21	6.80	8.00	7.40				240				1.20	0.10		0.10
22	6.90	8.00	7.40				198				1.30	0.10		0.07
23	6.80	8.00	7.50				194				1.20	0.09		0.07
24	6.90	8.00	7.50				198				1.10	0.08		0.07
25	6.90	7.90	7.50		76	398	182				1.30	0.07		0.05
26	6.80	7.90	7.50				200				1.20	0.10		0.06
27	6.70	8.00	7.20				188				1.40	0.15		0.06
28	6.70	8.00	7.40				186				1.30	0.13		0.06
29	6.90	8.20	7.60				180				1.30	0.10		0.06
30	6.80	8.20	7.50				184				1.20	0.09		0.06
31														
AVERAGE	6.8	8.1	7.5	#DIV/0!	76	404	188	#DIV/0!	#DIV/0!	#DIV/0!	1.26	0.09	#DIV/0!	0.07

OPTIONAL INFORMATION--Surface Water Plants Only

KENTUCKY DIVISION OF WATER
DRINKING WATER BRANCH
WATER TREATMENT PLANT MONTHLY OPERATION REPORT

PWS ID : KY0210067
PLANT ID: A
AGENCY INTEREST: 696
REPORT MONTH/YEAR: 04/2011

AREA-WIDE OPTIMIZATION PROGRAM TURBIDITY DATA

COPY PAGE AS NEEDED

ANALYTICAL RESULTS (NTU)																
DAY	RAW DAILY MAXIMUM	SEDIMENTATION BASIN EFFLUENT DAILY MAXIMUM						INDIVIDUAL FILTER EFFLUENT DAILY MAXIMUM							CFE DAILY MAXIMUM
		#1	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#6	#7	
1	0.07	0.27						0.07	0.06						0.07
2	0.05	0.30						0.06	0.05						0.06
3	0.06	0.23						0.06	0.05						0.06
4	0.08	0.34						0.06	0.06						0.06
5	0.08	0.35						0.06	0.07						0.07
6	0.09	0.54						0.06	0.05						0.06
7	0.08	0.51						0.08	N/A						0.08
8	0.08	0.48						0.08	0.07						0.08
9	0.09	0.48						0.10	0.07						0.10
10	0.10	0.33						0.09	0.10						0.10
11	0.09	0.35						0.09	0.09						0.09
12	0.07	0.32						0.08	0.07						0.08
13	0.08	0.35						0.09	0.08						0.09
14	0.10	0.77						0.06	0.06						0.06
15	0.10	0.34						0.06	0.06						0.06
16	0.09	0.36						0.06	0.07						0.07
17	0.09	0.34						0.07	0.07						0.07
18	0.09	0.31						0.07	0.06						0.07
19	0.08	0.31						0.05	0.06						0.06
20	0.10	5.80						0.07	0.08						0.08
21	0.10	0.58						0.08	0.10						0.10
22	0.10	0.21						0.06	0.06						0.06
23	0.09	0.23						0.06	0.07						0.07
24	0.08	0.21						0.06	0.07						0.07
25	0.07	0.23						0.06	0.06						0.06
26	0.10	0.21						0.05	0.05						0.05
27	0.15	0.18						0.06	0.05						0.06
28	0.14	0.17						0.07	0.07						0.07
29	0.10	0.21						0.06	0.06						0.06
30	0.09	0.20						0.06	0.05						0.06
31															
AVERAGE	0.1	0.5	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.07	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.07

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWSID: KY0210067
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 04/2011

*Please answer Y/N question below this chart.

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

DAY	FLUORIDE RAW	FLUORIDE TAP	IRON RAW	IRON TAP	MANGANESE RAW	MANGANESE TAP	RAW	TAP	Lowest Daily Chlorine Residual Plant Tap On-Line Chlorine Analyzer FREE / TOTAL	RAINFALL INCHES	WATER TEMP. DEGREES F°/C°
1		1.10							1.32	0.0	16.0
2		1.10							1.19	0.0	16.0
3		1.20							1.24	0.0	16.0
4	0.30	1.20	0.17	0.01		0.04			1.20	1.0	16.0
5		1.10							1.14	0.0	16.0
6		1.20							1.29	0.0	16.0
7		1.30							1.16	0.1	16.0
8		1.30							1.05	0.0	16.0
9		1.30							1.18	0.6	16.0
10		1.30							1.10	0.0	16.0
11	0.17	1.10	0.09	0.01		0.03			1.20	2.8	16.0
12		1.00							1.23	0.0	16.0
13		1.10							1.20	0.0	16.0
14		1.30							1.14	0.0	16.0
15		1.30							1.20	0.7	16.0
16		1.20							1.12	0.5	16.0
17		1.10							1.33	0.0	16.0
18	0.27	1.30	0.09	0.01		0.04			1.38	0.5	16.0
19		1.20							1.34	1.0	16.0
20		1.20							1.10	0.0	16.0
21		1.30							1.10	0.0	16.0
22		1.10							1.11	1.0	16.0
23		1.10							0.98	0.9	16.0
24		1.00							1.17	0.7	16.0
25	0.29	1.10	0.09	0.01		0.03			1.38	0.4	16.0
26		1.10							1.24	1.0	16.0
27		1.20							1.21	0.9	16.0
28		1.20							1.11	0.1	16.0
29		1.10							1.10	0.0	16.0
30		1.10							0.98	0.0	16.0
31											
AVERAGE	0.26	1.17	0.11	0.01	#DIV/0!	0.03	#DIV/0!	#DIV/0!	Monthly Minimum	Total Rainfall	16.0
									0.98	12.19	

Number of readings	30
For Free Chlorine, # less than 0.2 mg/L	0
For Chloramines, # less than 0.5 mg/L	

DisInfectant Chloramines? (Y/N) N

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS WITH FILTRATION

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 04/2011

		FILTER OPERATION									
	TOTAL WASH WATER	No: 1 AREA (square foot)		No: 2 AREA (square foot)		No: AREA (square foot)		No: AREA (square foot)		No: AREA (square foot)	
DAY	GALLONS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS
1	48,000	48,000	11.90		12.40						
2	0		11.80		11.80						
3	0		11.60		11.60						
4	0		12.10		12.10						
5	52,800	52,800	12.00		12.50						
6	0		11.10		11.10						
7	0		12.50		12.50						
8	0		12.10		12.10						
9	132,000	60,000	13.50	72,000	13.50						
10	72,000	36,000	13.10	36,000	13.10						
11	0		12.30		12.30						
12	48,000		11.80	48,000	11.30						
13	48,000	48,000	12.10		12.60						
14	0		12.00		12.00						
15	52,800		12.80	52,800	12.30						
16	0		11.30		11.30						
17	0		12.70		12.70						
18	48,000		12.80	48,000	12.30						
19	50,400	50,400	11.60		12.10						
20	60,000	60,000	14.00		14.50						
21	96,000		14.00	96,000	13.50						
22	72,000	72,000	12.20		12.70						
23	0		12.10		12.10						
24	0		11.50		11.50						
25	0		12.20		12.20						
26	52,800		13.10	52,800	12.60						
27	0		12.60		12.60						
28	0		11.50		11.50						
29	48,000	48,000	12.60		13.10						
30	0		12.00		12.00						
31	0										
TOTAL	880,800	475,200	368.90	405,600	369.90	0	0.00	0	0.00	0	0.00
AVERAGE	28,413	52,800	12.297	57,943	12.330	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

COPY AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A

ALL WATER SYSTEMS

REPORT MONTH/YEAR: 04/2011

	DISTRIBUTION SYSTEM OPERATION											
	CHEMICALS ADDED			TEST RESULTS								
	CHLORINE BOOSTER	CHLORINE BOOSTER		TOTAL (T) AND FREE (F) CHLORINE RESIDUAL (ppm)								
				NORTH		SOUTH		EAST		WEST		
DAY	LBS	LBS		T	F	T	F	T	F	T	F	
1					1.20		1.00					
2									1.10		1.30	
3					1.30		1.00					
4									0.70		1.20	
5					1.10		0.70					
6									0.90		1.40	
7					1.20		1.20					
8									1.00		1.20	
9					1.30		1.00					
10									0.90		1.30	
11					1.20		0.90					
12									0.90		1.00	
13					1.20		0.90					
14									1.00		1.20	
15					1.20		1.00					
16									0.90		1.00	
17					1.10		0.80					
18									0.90		1.20	
19					1.30		0.90					
20									0.50		1.20	
21					1.21		1.00					
22									1.10		1.30	
23					1.10		0.90					
24									0.80		0.90	
25					1.20		0.90					
26									1.10		1.50	
27					1.10		0.90					
28									1.20		1.30	
29					1.20		0.90					
30									0.80		0.90	
31												
AVERAGE	#DIV/0!	#DIV/0!	Average	#DIV/0!	1.19	#DIV/0!	0.93	#DIV/0!	0.92	#DIV/0!	1.19	
TOTAL	0.0	0.0	Total Minimum									
			Free Minimum		1.10		0.70		0.50		0.90	
			Total # Chlorine Samples	0	15	0	15	0	15	0	15	
			# Less than 0.2 mg/L/0.5 mg/L	0	0	0	0	0	0	0	0	

Number of Free Residuals	60	Minimum Monthly Free Residual	0.50
Number of Total Residuals	0	Minimum Monthly Total Residual	0.00
Total # Less than 0.2 mg/L	0		
Total # Less than 0.5 mg/L			

Disinfectant Chloramines? (Y/N): N

Number of days of operation?: 30

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067

TURBIDITY REPORT

PLANT ID: A

APPLICABLE TO ALL PLANTS WITH FILTRATION

Report Period (MM/YYYY): 04/2011

PWS Name: Carrollton Utilities

DAY	Hours Plant Operated	# of Turbidity Samples Required*	Mid - 4 am	4 am - 8 am	8 am - Noon	Noon - 4 pm	4 pm - 8 pm	8 pm - Mid	Daily Maximum
1	12.4	4		0.06	0.06	0.06	0.06		0.060
2	11.8	3			0.06	0.05	0.05		0.060
3	11.6	3			0.05	0.05	0.05		0.050
4	12.1	4		0.05	0.05	0.05	0.06		0.060
5	12.5	4		0.06	0.06	0.06	0.06		0.060
6	11.1	3			0.07	0.06	0.05		0.070
7	12.5	4		0.05	0.05	0.08	0.09		0.090
8	12.1	4		0.06	0.06	0.08	0.07		0.080
9	14.0	4		0.08	0.08	0.07	0.08		0.080
10	13.6	4		0.10	0.10	0.09	0.09		0.100
11	12.3	4		0.08	0.08	0.08	0.09		0.090
12	11.8	3			0.08	0.07	0.07		0.080
13	12.6	4		0.08	0.08	0.08	0.09		0.090
14	12.0	3			0.07	0.07	0.06		0.070
15	12.8	4		0.06	0.06	0.06	0.06		0.060
16	11.3	3			0.06	0.07	0.06		0.074
17	12.7	4		0.07	0.07	0.06	0.07		0.070
18	12.8	4		0.06	0.06	0.07	0.06		0.070
19	12.1	4		0.05	0.05	0.05	0.05		0.050
20	14.5	4		0.08	0.08	0.08	0.08		0.080
21	14.0	4		0.10	0.10	0.10	0.10		0.100
22	12.7	4		0.07	0.07	0.07	0.06		0.070
23	12.1	4		0.07	0.07	0.07	0.06		0.070
24	11.5	3			0.07	0.07	0.06		0.070
25	12.2	4		0.05	0.05	0.05	0.06		0.060
26	13.1	4		0.06	0.06	0.05	0.05		0.060
27	12.6	4		0.06	0.06	0.06	0.05		0.060
28	11.5	3			0.06	0.06	0.06		0.060
29	13.1	4		0.06	0.06	0.05	0.06		0.060
30	12.0	3			0.06	0.05	0.05		0.060
31	0.0	0							0.000
Total	373.4	111				TOTAL # OF TURBIDITY SAMPLES TAKEN -->		111	0.100

ARE YOU USING EITHER CONVENTIONAL or DIRECT FILTRATION? (Y/N) Y
(Any type of filtration besides slow sand)

Number of samples exceeding ---> 0.1 NTU 0 0.3 NTU 0 1 NTU 0

For slow sand filtration, the number of samples exceeding ---> 1 NTU _____ 5 NTU _____

*NOTE: The "Number of Turbidity Samples Required" is the number of hours the plant operated divided by 4 rounded up to the next whole number.

I certify that the above turbidity readings were taken every 4 hours during plant operation and in the time frames noted above.

Signature of Principal Executive Officer or Authorized Agent

5/2/11
Date

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL SURFACE WATER PLANTS WITH FILTRATION

INDIVIDUAL FILTER TURBIDITY EXCEEDANCE REPORT

PWS Name: Carrollton Utilities

PWS ID: KY0210067

PLANT ID: A

Report Period (MM/YYYY): 04/2011

If any filter exceeded any one of the individual filter turbidity triggers below, (also listed on the Summary Sheet), complete the following and submit the appropriate report(s).

Date	Filter Number	Turbidity Reading (NTU)	Trigger Level (see below)	Reason for Exceedance (if known)	Date and Time State was Contacted

Trigger Levels:

A. Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart.

B. Any one filter has a measured turbidity level of greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of operation following a backwash or return to service.

C. Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 3 consecutive months.

D. Any one filter has a measured turbidity level of greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 2 consecutive months.

Report Required:

For Trigger A.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger B.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger C.: Filter number, the turbidity measurement, the date of exceedance and a filter self-assessment within 14 days of the exceedance

For Trigger D.: Filter number, the turbidity measurement, the date of exceedance and arrange for a Comprehensive Performance Evaluation (CPE) with the Drinking Water Branch no later than 30 days following the exceedance

MAKE COPIES AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS

PWS ID : KY0210067

PLANT ID: A

REPORT MONTH/YEAR: 04/2011

COLUMN HEADINGS MAY BE CHANGED BASED UPON DATA

	ADDITIONAL DATA													
DAY														
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
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17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
TOTAL	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) PLANT SUMMARY FORM

PWS ID **KY0210067** MONITORING PERIOD (MMYYYY) **04/2011**

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PLANT INFORMATION
APPLICABLE TO ALL PLANTS

PLANT ID	A	TOTAL WATER TREATED (gallons)	22,971,000
PLANT NAME	Carrollton Water Treatment Plant	AVE. DAILY PRODUCTION (gallons)	765,700
AGENCY INTEREST	696	MAXIMUM PUMPAGE (gallons per day)	861,000

INDIVIDUAL FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE **0100**

Was each filter monitored continuously? (Y/N)	Y
Were measurements recorded every 15 minutes? (Y/N)	Y
Was there a failure of the continuous monitoring equipment? (Y/N)	N
If Yes, (1) were individual filter effluent turbidity grab samples collected every four hours of operation? (Y/N)	Y
(2) was the continuously monitoring equipment repaired within 5 working days? (Y/N)	
Was individual filter level greater than 1.0 NTU in two consecutive measurements? (Y/N)	N
Was individual filter level greater than 0.5 NTU in two consecutive measurements after on line for more than four hours? (Y/N)	N
Was individual filter level greater than 1.0 NTU in two consecutive measurements in three consecutive months? (Y/N)	N
Was individual filter level greater than 2.0 NTU in two consecutive measurements in two consecutive months? (Y/N)	N

If any of the last 4 boxes are YES, fill out the Individual Filter Turbidity Sheet and submit with the MOR

COMBINED FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE **0100**

Number of hours of plant operation	373.4
Were samples taken every 4 hours of plant operation? (Y/N)	Y
Number of samples taken	111
Highest single turbidity reading	0.10
For all filtration except slow sand filtration:	
Number of samples exceeded 0.1 NTU	0
Number of samples exceeded 0.3 NTU	0
Number of samples exceeded 1 NTU	0
When filtration is slow sand filtration:	
Number of samples exceeded 1 NTU	
Number of samples exceeded 5 NTU	

ENTRY POINT RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL PLANTS

ANALYTE CODE **0999**

Number of days of plant operation	30
Were samples taken each day of operation? (Y/N)	Y
Number of lowest chlorine samples recorded	30
Lowest single chlorine reading	0.98
If less than required:	
Was residual restored within 4 hours of plant operation? (Y/N)	
Free Chlorine (for all disinfectants except chloromine):	
Number of samples under 0.2 mg/L	0
Total Chlorine (when disinfectant is Chloramine):	
Number of samples under 0.5 mg/L.	

CHLORINE DIOXIDE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE **1008**

Number of days of plant operation	30
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorine dioxide reading	0.00
Number of chlorine dioxide samples exceeded 0.8 mg/L	0

CHLORITE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE **1009**

Number of days of plant operation	30
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorite reading	0.00
Number of chlorite samples exceeded 1 mg/L	0

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Signature of Principal Executive Officer or Authorized Agent

05/02/11
Date

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) SUMMARY FORM

PWS ID KY0210067 MONITORING PERIOD (MMYYYY) 04/2011

AI 696

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PURCHASED		SOLD	
APPLICABLE TO ALL WATER SYSTEMS			
FROM WHOM? (PWS ID)	HOW MUCH? (gallons)	TO WHOM? (PWS ID)	HOW MUCH? (gallons)
		KY0210008	4,933,015
		KY0210066	0

DISTRIBUTION RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL WATER SYSTEMS

ANALYTE CODE 0999

Number of days of operation	30
Were samples taken each day of operation? (Y/N)	Y
Number of samples taken:	
FREE	60
TOTAL	0
Lowest single FREE chlorine reading	0.50
Lowest single TOTAL chlorine reading	0.00

Free Chlorine (for all disinfectants except chloramine)
Number of samples under 0.2 mg/L 0

Total Chlorine (when disinfectant is chloramine)
Number of samples under 0.5 mg/L

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Signature of Principal Executive Officer or Authorized Agent

05/02/11
Date

KENTUCKY DIVISION OF WATER

Revised 01/04/07

DRINKING WATER BRANCH

MONTHLY OPERATION REPORT (MOR)--ALL WATER SYSTEMS

MONTH & YEAR (mm/yyyy) 07/2011

Indicate one with "X"

	SURFACE WATER
X	GROUNDWATER
	PURCHASE/DISTRIBUTE ONLY

DEP Form 4012--Revised 07/2006

PWS ID :	KY0210067 PLANT ID: A	PLANT NAME:	Carrollton Water Treatment Plant
PWS NAME:	Carrollton Utilities	PLANT CLASS: III	DIST. CLASS: II
AGENCY INTEREST (AI):	696	DATE MAILED:	8/5/2011
SOURCE NAME:	Ohio River Alluvial Aquifer	COUNTY:	Carroll

	OPERATOR(S) RESPONSIBLE / IN-CHARGE	CLASS	CERTIFICATION NUMBER
WTP SHIFT 1:	Franklin W. Thieman II	IIIA	19184
WTP SHIFT 2:	Chris Rose	IIIA	19857
WTP SHIFT 3:			
DISTRIBUTION:	Larry Hayes	IID	9662

THIS REPORT MUST BE RECEIVED BY THE DIVISION OF WATER AND APPLICABLE FIELD OFFICE NO LATER THAN 10 DAYS AFTER THE END OF THE MONTH.

TREATMENT PLANTS COMPLETE:

1. DESIGN CAPACITY (gpm):	1040 gpm
2. TYPE OF FILTRATION USED:	Mixed Media
3. DESIGN FILTRATION RATE (gpm/sq. ft.):	Not to exceed 5gpm/sq.ft.
4. PERCENT BACKWASH WATER USED:	1.8
5. DATE FLOCCULATION BASIN(S) LAST CLEANED:	7/13/2011
6. DATE SETTLING BASIN(S) LAST CLEANED:	Claricone Unit

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possiblity of fine and imprisonment. See KRS 224.99-010 and 401 KAR 8:020. (Penalities under this statute and regulation may include fines up to $25,000 per violation or by imprisonment for not more that one year, or both).

Franklin W. Thieman II — 8/3/2011

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT — DATE

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 07/2011
PAGE 1 OF 11

APPLICABLE TO ALL PLANTS

	RAW WATER TREATED	HOURS PLANT OPERATED	COAGULANT		COAGULANT Polymer		pH ADJUSTMENT CaO Lime Pre		DISINFECTANT Cl2 Chlorine Pre		DISINFECTANT Post	
DAY	GALLONS		LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1	839,000	13.1			221.0	31.6	1925.0	275.1	13.0	1.9		
2	906,000	14.1			238.0	31.5	2072.0	274.2	20.0	2.6		
3	734,000	12.7			215.0	35.1	1767.0	288.7	22.0	3.6		
4	786,000	12.7			215.0	32.8	1651.0	251.9	9.0	1.4		
5	856,000	13.5			228.0	31.9	1715.0	240.2	16.0	2.2		
6	820,000	13.0			219.0	32.0	1651.0	241.4	11.0	1.6		
7	825,000	13.1			222.0	32.3	1794.0	260.7	20.0	2.9		
8	833,000	13.3			225.0	32.4	1795.0	258.4	16.0	2.3		
9	735,000	11.9			201.0	32.8	1547.0	252.4	11.0	1.8		
10	839,000	13.5			228.0	32.6	1634.0	233.5	8.0	1.1		
11	908,000	14.9			252.0	33.3	1743.0	230.2	15.0	2.0		
12	887,000	14.1			238.0	32.2	1649.0	222.9	13.0	1.8		
13	795,000	12.7			214.0	32.3	1587.0	239.4	27.0	4.1		
14	894,000	14.2			240.0	32.2	2059.0	276.2	20.0	2.7		
15	878,000	14.2			240.0	32.8	1846.0	252.1	19.0	2.6		
16	937,000	15.0			254.0	32.5	1755.0	224.6	9.0	1.2		
17	853,000	13.7			232.0	32.6	1671.0	234.9	15.0	2.1		
18	854,000	13.3			225.0	31.6	1622.0	227.7	15.0	2.1		
19	960,000	15.3			258.0	32.2	2218.0	277.0	18.0	2.2		
20	853,000	13.3			225.0	31.6	1689.0	237.4	18.0	2.5		
21	890,000	14.3			242.0	32.6	1816.0	244.7	20.0	2.7		
22	905,000	14.5			245.0	32.5	1697.0	224.8	10.0	1.3		
23	963,000	15.5			262.0	32.6	1891.0	235.5	16.0	2.0		
24	901,000	14.3			241.0	32.1	1744.0	232.1	12.0	1.6		
25	928,000	14.2			240.0	31.0	1917.0	247.7	22.0	2.8		
26	965,000	15.2			257.0	31.9	2006.0	249.3	18.0	2.2		
27	859,000	13.9			235.0	32.8	1835.0	256.1	13.0	1.8		
28	955,000	15.4			261.0	32.8	1879.0	235.9	12.0	1.5		
29	975,000	15.8			267.0	32.8	1928.0	237.1	13.0	1.6		
30	884,000	14.0			236.0	32.0	1708.0	231.7	14.0	1.9		
31	886,000	14.1			238.0	32.2	1861.0	251.9	30.0	4.1		
TOTAL	27,103,000		0.0		7314.0		55672.0		495.0		0.0	
AVERAGE	874,290		#DIV/0!	#DIV/0!	235.9	32.4	1795.9	246.6	16.0	2.2	#DIV/0!	#DIV/0!
MAX	975,000											

NUMBER DAYS IN OPERATION 31

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 07/2011

	CHEMICALS ADDED													
	DISINFECTANT		FLUORIDE		CARBON		pH ADJUSTMENT Post		$KMnO_4$		CORROSION INHIBITOR			
DAY	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1			6.9	1.0										
2			9.0	1.2										
3			8.3	1.4										
4			8.1	1.2										
5			7.8	1.1										
6			7.1	1.0										
7			7.1	1.0										
8			7.1	1.0										
9			6.0	1.0										
10			5.9	1.0										
11			8.1	1.1										
12			7.4	1.0										
13			6.4	1.0										
14			7.4	1.0										
15			7.4	1.0										
16			7.8	1.0										
17			6.9	1.0										
18			6.7	0.9										
19			8.5	1.1										
20			7.4	1.0										
21			7.8	1.1										
22			7.8	1.0										
23			8.1	1.0										
24			7.6	1.0										
25			8.1	1.0										
26			8.3	1.0										
27			7.4	1.0										
28			7.8	1.0										
29			8.1	1.0										
30			6.9	0.9										
31			7.6	1.0										
TOTAL	0.0		233.5		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	7.5	1.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 07/2011

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)														
	pH			TOTAL ALKALINITY		TOTAL HARDNESS		CHLORINE RESIDUAL				TURBIDITY (NTU)		
								TOP OF FILTER		PLANT TAP				
DAY	RAW	TOP OF FILTER	TAP	RAW	TAP	RAW	TAP	TOTAL	FREE	TOTAL	FREE	RAW	SETTLED WATER	PLANT TAP
1	7.00	8.30	7.80				166				0.90	0.03		0.03
2	6.90	8.40	7.80				170				1.20	0.02		0.02
3	6.90	8.50	7.90				174				1.30	0.03		0.02
4	7.00	8.50	8.00		70	440	180				1.50	0.03		0.02
5	7.00	8.40	8.00				170				1.10	0.02		0.02
6	7.00	8.40	8.00				170				1.00	0.02		0.02
7	7.00	8.50	8.00				164				1.00	0.02		0.03
8	6.90	8.50	8.10				180				1.20	0.02		0.04
9	6.90	8.40	7.90				184				1.00	0.02		0.02
10	7.00	8.70	8.40				178				1.30	0.02		0.10
11	7.00	8.70	8.10		62	430	184				1.20	0.02		0.02
12	7.00	8.50	8.10				170				1.20	0.02		0.02
13	6.90	8.70	7.90				176				1.10	0.03		0.02
14	6.80	7.80	7.90				188				0.90	0.03		0.02
15	7.00	8.20	7.60				186				1.10	0.04		0.02
16	7.00	8.30	8.00				184				1.20	0.02		0.02
17	7.00	8.70	7.90				178				1.20	0.02		0.02
18	7.00	8.60	8.00		68	420	170				1.10	0.02		0.02
19	6.90	8.50	7.90				174				1.00	0.03		0.02
20	6.80	8.60	8.00				170				1.30	0.03		0.02
21	7.00	8.10	8.00				174				1.00	0.03		0.02
22	7.00	8.10	7.90				186				1.20	0.05		0.02
23	7.00	8.60	7.80				190				1.00	0.02		0.02
24	7.00	8.40	7.90				170				1.10	0.02		0.02
25	6.80	8.20	7.80		74	466	182				1.10	0.02		0.02
26	6.90	8.60	8.00				184				1.00	0.02		0.02
27	6.90	8.50	7.90				174				0.70	0.02		0.03
28	7.00	8.30	8.00				180				1.00	0.02		0.02
29	7.00	8.60	8.00				168				1.20	0.02		0.02
30	7.10	8.60	8.10				170				1.10	0.02		0.02
31	6.90	8.40	7.90				174				1.00	0.03		0.02
AVERAGE	7.0	8.4	8.0	#DIV/0!	69	439	176	#DIV/0!	#DIV/0!	#DIV/0!	1.10	0.02	#DIV/0!	0.02

OPTIONAL INFORMATION--Surface Water Plants Only

KENTUCKY DIVISION OF WATER
DRINKING WATER BRANCH
WATER TREATMENT PLANT MONTHLY OPERATION REPORT

PWS ID : KY0210067
PLANT ID: A
AGENCY INTEREST: 696
REPORT MONTH/YEAR: 07/2011

AREA-WIDE OPTIMIZATION PROGRAM TURBIDITY DATA

COPY PAGE AS NEEDED

ANALYTICAL RESULTS (NTU)															
	RAW	SEDIMENTATION BASIN EFFLUENT DAILY MAXIMUM						INDIVIDUAL FILTER EFFLUENT DAILY MAXIMUM							CFE
DAY	DAILY MAXIMUM	#1	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#6	#7	DAILY MAXIMUM
1	0.03	0.14						0.03	0.03						0.03
2	0.03	0.14						0.03	0.03						0.03
3	0.03	0.15						0.03	0.03						0.03
4	0.02	0.08						0.04	0.08						0.08
5	0.02	0.08						0.03	0.02						0.03
6	0.02	0.07						0.03	0.02						0.03
7	0.02	0.12						0.02	0.03						0.03
8	0.03	0.14						0.02	0.03						0.03
9	0.02	0.10						0.03	0.02						0.03
10	0.02	0.08						0.03	0.03						0.03
11	0.02	0.09						0.03	0.03						0.03
12	0.02	0.08						0.03	0.03						0.02
13	0.03	0.13						0.02	0.02						0.02
14	0.03	0.14						0.03	0.02						0.03
15	0.04	0.11						0.03	0.04						0.04
16	0.02	0.08						0.03	0.05						0.05
17	0.02	0.06						0.02	0.04						0.04
18	0.02	0.11						0.02	0.04						0.04
19	0.03	0.13						0.02	0.02						0.02
20	0.03	0.12						0.03	0.03						0.03
21	0.03	0.08						0.03	0.02						0.03
22	0.02	0.09						0.02	0.04						0.04
23	0.02	0.11						0.03	0.03						0.03
24	0.02	0.08						0.03	0.04						0.04
25	0.02	0.10						0.03	0.02						0.03
26	0.02	0.12						0.02	0.03						0.03
27	0.02	0.06						0.02	0.03						0.03
28	0.02	0.10						0.03	0.04						0.04
29	0.02	0.09						0.02	0.04						0.04
30	0.02	0.09						0.05	0.04						0.05
31	0.03	0.07						0.02	0.03						0.03
AVERAGE	0.0	0.1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.03	0.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.03

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWSID: KY0210067
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 07/2011

*Please answer Y/N question below this chart.

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

	FLUORIDE		IRON		MANGANESE				Lowest Daily Chlorine Residual Plant Tap On-Line Chlorine Analyzer	RAINFALL	WATER TEMP. DEGREES
DAY	RAW	TAP	RAW	TAP	RAW	TAP	RAW	TAP	FREE / TOTAL	INCHES	F°/C°
1		1.00							0.62	0.0	16.0
2		1.10							1.27	0.0	16.0
3		1.20							1.14	0.2	16.0
4	0.02	1.30	0.08	0.02		0.08			1.21	0.2	16.0
5		1.50							1.21	0.0	16.0
6		1.30							1.18	0.0	16.0
7		1.20							1.00	0.6	16.0
8		1.20							1.23	0.0	16.0
9		1.00							1.00	0.5	16.0
10		1.10							0.91	0.0	16.0
11	0.40	1.00	0.15	0.02		0.03			1.10	0.0	16.0
12		1.10							1.15	0.0	16.0
13		1.00							1.04	0.0	16.0
14		1.00							0.90	0.0	16.0
15		1.00							1.14	0.0	16.0
16		1.20							1.09	0.0	16.0
17		1.40							1.11	0.0	16.0
18	0.30	1.10	0.13	0.02		0.02			1.14	0.0	16.0
19		1.30							1.08	0.8	16.0
20		1.20							1.30	0.0	16.0
21		1.30							1.15	0.0	16.0
22		1.30							1.15	0.0	16.0
23		1.10							1.15	0.0	16.0
24		1.20							1.09	0.0	16.0
25	0.30	1.30	0.15	0.05		0.02			1.17	0.0	16.0
26		1.20							1.00	0.0	16.0
27		1.10							1.10	0.0	16.0
28	0.40	1.20							1.22	0.0	16.0
29	0.40	1.20							1.17	0.0	16.0
30	0.40	1.20							1.20	0.0	16.0
31	0.33	0.90							1.05	0.0	16.0
AVERAGE	0.32	1.17	0.12	0.03	#DIV/0!	0.04	#DIV/0!	#DIV/0!	Monthly Minimum	Total Rainfall	16.0
									0.62		

Number of readings	31	2.23
For Free Chlorine, # less than 0.2 mg/L	0	
For Chloramines, # less than 0.5 mg/L		

Disinfectant Chloramines? (Y/N) N

Ground Water Rule Minimum Chlorine Residual Report Form

PWSID: KY0210067

PLANT ID: A

REPORT MONTH/YEAR: 07/2011

APPLICABLE TO ALL PLANTS

*Please answer questions below this chart.

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

DAY	Lowest Daily Chlorine Residual Plant Tap On-Line Chlorine Analyzer FREE / TOTAL
1	0.62
2	1.27
3	1.14
4	1.21
5	1.21
6	1.18
7	1.00
8	1.23
9	1.00
10	0.91
11	1.10
12	1.15
13	1.04
14	0.90
15	1.14
16	1.09
17	1.11
18	1.14
19	1.08
20	1.30
21	1.15
22	1.15
23	1.15
24	1.09
25	1.17
26	1.00
27	1.10
28	1.22
29	1.17
30	1.20
31	1.05
AVERAGE	Monthly Minimum
	0.62
Number of readings	31
Ground Water Systems For Free Chlorine # less than minimum	

Number of Days of Plant Operation? 31

Required Ground Water Minimum Chlorine Residual? 0.2

Disinfectant Chloramines? (Y/N) Y

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS WITH FILTRATION

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 07/2011

		FILTER OPERATION									
	TOTAL WASH WATER	No: 1 AREA (square feet)		No: 2 AREA (square feet)		No: AREA (square feet)		No: AREA (square feet)		No: AREA (square feet)	
DAY	GALLONS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS	WASHWATER GALLONS	FILT RUN HRS
1	48,000	48,000	12.60		13.10						
2	0		14.10		14.10						
3	0		12.70		12.70						
4	0		12.70		12.70						
5	55,200		13.50	55,200	13.00						
6	0		13.00		13.00						
7	0		13.10		13.10						
8	43,200	43,200	12.80		13.30						
9	0		11.90		11.90						
10	0		13.50		13.50						
11	48,000		14.90	48,000	14.40						
12	0		14.10		14.10						
13	0		12.70		12.70						
14	0		14.20		14.20						
15	52,800	52,800	13.70		14.20						
16	55,200		15.00	55,200	14.50						
17	0		13.70		13.70						
18	0		13.30		13.30						
19	0		15.30		15.30						
20	48,000	48,000	12.80		13.30						
21	0		14.30		14.30						
22	48,000	48,000	14.00		14.50						
23	0		15.50		15.50						
24	0		14.30		14.30						
25	0		14.20		14.20						
26	48,000		15.20	48,000	14.70						
27	0		13.90		13.90						
28	0		15.40		15.40						
29	48,000	48,000	15.30		15.80						
30	0		14.00		14.00						
31	0		14.10		14.10						
TOTAL	494,400	288,000	429.80	206,400	430.80	0	0.00	0	0.00	0	0.00
AVERAGE	15,948	48,000	13.865	51,600	13.897	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

COPY AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A

ALL WATER SYSTEMS

REPORT MONTH/YEAR: 07/2011

	DISTRIBUTION SYSTEM OPERATION											
	CHEMICALS ADDED			TEST RESULTS								
				TOTAL (T) AND FREE (F) CHLORINE RESIDUAL (ppm)								
	CHLORINE BOOSTER	CHLORINE BOOSTER		NORTH		SOUTH		EAST		WEST	
DAY	LBS	LBS		T	F	T	F	T	F	T	F
1									0.60		0.60
2					1.10		0.90				
3									0.80		0.90
4					1.70		1.00				
5									1.30		1.30
6					1.00		0.90		0.75		0.95
7									0.80		0.90
8					1.20		0.90				
9									0.90		1.00
10					1.40		1.10				
11									1.00		1.20
12					1.20		1.20				
13									0.70		0.60
14					0.80		0.90				
15									0.80		0.90
16					1.20		0.70				
17									1.20		1.00
18					0.90		1.00				
19									1.00		0.80
20					1.20		0.80		0.54		0.36
21									0.70		0.90
22					1.10		0.70				
23									1.00		1.00
24					1.10		1.00				
25									0.80		0.90
26					1.00		0.80				
27									0.80		1.00
28					1.00		1.00				
29									1.00		1.00
30					1.20		0.70				
31									1.00		0.90
AVERAGE	#DIV/0!	#DIV/0!	Average	#DIV/0!	1.14	#DIV/0!	0.91	#DIV/0!	0.87	#DIV/0!	0.93
TOTAL	0.0	0.0	Total Minimum								
			Free Minimum		0.80		0.70		0.54		0.60
			Total # Chlorine Samples	0	15	0	15	0	18	0	18
			# Less than 0.2 mg/L/0.5 mg/L	0	0	0	0	0	0	0	0

Number of Free Residuals	66	Minimum Monthly Free Residual	0.54
Number of Total Residuals	0	Minimum Monthly Total Residual	0.00
Total # Less than 0.2 mg/L	0		
Total # Less than 0.5 mg/L			

Disinfectant Chloramines? (Y/N) N

Number of days of operation? 31

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067

TURBIDITY REPORT PLANT ID: A

APPLICABLE TO ALL PLANTS WITH FILTRATION Report Period (MM/YYYY): 07/2011 PAGE: 8 OF 11

PWS Name: Carrollton Utilities

DAY	Hours Plant Operated	# of Turbidity Samples Required*	Mid - 4 am	4 am - 8 am	8 am - Noon	Noon - 4 pm	4 pm - 8 pm	8 pm - Mid	Daily Maximum
1	13.1	4		0.03	0.03	0.02	0.02		0.030
2	14.1	4		0.02	0.02	0.03	0.03		0.030
3	12.7	4		0.03	0.03	0.03	0.03		0.030
4	12.7	4		0.03	0.03	0.08	0.03		0.080
5	13.5	4		0.02	0.02	0.10	0.02		0.100
6	13.0	4		0.02	0.02	0.02	0.02		0.020
7	13.1	4		0.03	0.03	0.03	0.02		0.030
8	13.3	4		0.04	0.04	0.04	0.02		0.040
9	11.9	3			0.02	0.03	0.02		0.030
10	13.5	4		0.10	0.10	0.07	0.02		0.100
11	14.9	4		0.02	0.02	0.06	0.02		0.060
12	14.1	4		0.02	0.02	0.02	0.02		0.020
13	12.7	4		0.02	0.02	0.03	0.03		0.030
14	14.2	4		0.02	0.02	0.03	0.03		0.030
15	14.2	4		0.02	0.02	0.04	0.03		0.040
16	15.0	4		0.02	0.02	0.02	0.02		0.020
17	13.7	4		0.02	0.02	0.02	0.02		0.020
18	13.3	4		0.02	0.02	0.02	0.02		0.021
19	15.3	4		0.02	0.02	0.02	0.02		0.020
20	13.3	4		0.02	0.02	0.03	0.02		0.030
21	14.3	4		0.02	0.02	0.02	0.02		0.020
22	14.5	4		0.05	0.05	0.02	0.02		0.050
23	15.5	4		0.02	0.02	0.02	0.02		0.020
24	14.3	4		0.02	0.02	0.02	0.02		0.020
25	14.2	4		0.02	0.02	0.02	0.02		0.020
26	15.2	4		0.02	0.02	0.03	0.03		0.030
27	13.9	4		0.03	0.03	0.02	0.02		0.030
28	15.4	4		0.03	0.03	0.02	0.02		0.030
29	15.8	4		0.02	0.02	0.02	0.02		0.020
30	14.0	4		0.02	0.02	0.02	0.02		0.020
31	14.1	4		0.02	0.02	0.02	0.02		0.020
Total	432.8	123					TOTAL # OF TURBIDITY SAMPLES TAKEN –	123	0.100

ARE YOU USING EITHER CONVENTIONAL or DIRECT FILTRATION? (Y/N Y
(Any type of filtration besides slow sand)

Number of samples exceeding ---> 0.1 NTU 0 0.3 NTU 0 1 NTU 0

For slow sand filtration, the number of samples exceeding ---> 1 NTU _____ 5 NTU _____

*NOTE: The "Number of Turbidity Samples Required" is the number of hours the plant operated divided by 4 rounded up to the next whole number.

I certify that the above turbidity readings were taken every 4 hours during plant operation and in the time frames noted above.

Franklin W. Thurman II — Signature of Principal Executive Officer or Authorized Agent

8/3/11 — Date

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL SURFACE WATER PLANTS WITH FILTRATION

INDIVIDUAL FILTER TURBIDITY EXCEEDANCE REPORT

PWS Name: Carrollton Utilities

PWS ID: KY0210067

PLANT ID: A

Report Period (MM/YYYY): 07/2011

If any filter exceeded any one of the individual filter turbidity triggers below, *(also listed on the Summary Sheet), complete the following and submit* the appropriate report(s).

Date	Filter Number	Turbidity Reading *(NTU)*	Trigger Level *(see below)*	*Reason for Exceedance (if known)*	Date and Time State was Contacted

Trigger Levels:

A. **Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart.**
B. **Any one filter has a measured turbidity level of greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of operation following a backwash or return to service.**
C. **Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 3 consecutive months.**
D. **Any one filter has a measured turbidity level of greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 2 consecutive months.**

Report Required:

For Trigger A.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger B.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger C.: Filter number, the turbidity measurement, the date of exceedance and a filter self-assessment within 14 days of the exceedance

For Trigger D.: Filter number, the turbidity measurement, the date of exceedance and arrange for a Comprehensive Performance Evaluation (CPE) with the Drinking Water Branch no later than 30 days following the exceedance

MAKE COPIES AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067

PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 07/2011

COLUMN HEADINGS MAY BE CHANGED BASED UPON DATA

	ADDITIONAL DATA													
DAY														
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
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19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
TOTAL	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Ground Water Rule Minimum Chlorine Residual Report Form

PWS ID KY0210067 MONITORING PERIOD (MMYYYY) 07/2011

PLANT ID A

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

[redacted]

[redacted]

ENTRY POINT RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL PLANTS

ANALYTE CODE 0999

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	Y
Number of lowest chlorine samples recorded	31
Lowest single chlorine reading	0.62
If less than required:	
Was residual restored within 4 hours of plant operation? (Y/N)	
Free Chlorine (for all disinfectants except chloromine):	
Number of samples under minimum residual	
Total Chlorine (when disinfectant is Chloramine):	
Number of samples under 0.5 mg/L	0

[redacted]

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Franklin T. Shain II
Signature of Principal Executive Officer or Authorized Agent

08/03/11
Date

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) PLANT SUMMARY FORM

PWS ID **KY0210067** MONITORING PERIOD (MMYYYY) **07/2011**

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PLANT INFORMATION
APPLICABLE TO ALL PLANTS

PLANT ID	A	TOTAL WATER TREATED (gallons)	27,103,000
PLANT NAME	Carrollton Water Treatment Plant	AVE. DAILY PRODUCTION (gallons)	874,290
AGENCY INTEREST	696	MAXIMUM PUMPAGE (gallons per day)	975,000

INDIVIDUAL FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE **0100**

Was each filter monitored continuously? (Y/N)	Y
Were measurements recorded every 15 minutes? (Y/N)	Y
Was there a failure of the continuous monitoring equipment? (Y/N)	N
If Yes, (1) were individual filter effluent turbidity grab samples collected every four hours of operation? (Y/N)	Y
(2) was the continuously monitoring equipment repaired within 5 working days? (Y/N)	
Was individual filter level greater than 1.0 NTU in two consecutive measurements? (Y/N)	N
Was individual filter level greater than 0.5 NTU in two consecutive measurements after on line for more than four hours? (Y/N)	N
Was individual filter level greater than 1.0 NTU in two consecutive measurements in three consecutive months? (Y/N)	N
Was individual filter level greater than 2.0 NTU in two consecutive measurements in two consecutive months? (Y/N)	N

If any of the last 4 boxes are YES, fill out the Individual Filter Turbidity Sheet and submit with the MOR

COMBINED FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE **0100**

Number of hours of plant operation	432.8
Were samples taken every 4 hours of plant operation? (Y/N)	Y
Number of samples taken	123
Highest single turbidity reading	0.10
For all filtration except slow sand filtration:	
Number of samples exceeded 0.1 NTU	0
Number of samples exceeded 0.3 NTU	0
Number of samples exceeded 1 NTU	0
When filtration is slow sand filtration:	
Number of samples exceeded 1 NTU	
Number of samples exceeded 5 NTU	

ENTRY POINT RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL PLANTS

ANALYTE CODE **0999**

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	Y
Number of lowest chlorine samples recorded	31
Lowest single chlorine reading	0.62
If less than required:	
Was residual restored within 4 hours of plant operation? (Y/N)	
Free Chlorine (for all disinfectants except chloromine):	
Number of samples under 0.2 mg/L	0
Total Chlorine (when disinfectant is Chloramine):	
Number of samples under 0.5 mg/L	

CHLORINE DIOXIDE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE **1008**

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorine dioxide reading	0.00
Number of chlorine dioxide samples exceeded 0.8 mg/L	0

CHLORITE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE **1009**

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorite reading	0.00
Number of chlorite samples exceeded 1 mg/L	0

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. *Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.*

Franklin W. Thurman II — Signature of Prinicipal Executive Officer or Authorized Agent

08/03/11 — Date

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) SUMMARY FORM

PWS ID KY0210067 MONITORING PERIOD (MMYYYY) 07/2011

AI 696

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PURCHASED		SOLD	
APPLICABLE TO ALL WATER SYSTEMS			
FROM WHOM? (PWS ID)	HOW MUCH? (gallons)	TO WHOM? (PWS ID)	HOW MUCH? (gallons)
		KY0210008	6,332,442
		KY0210066	0

DISTRIBUTION RESIDUAL DISINFECTANT CONCENTRATION

APPLICABLE TO ALL WATER SYSTEMS

ANALYTE CODE 0999

Number of days of operation	31
Were samples taken each day of operation? (Y/N)	Y
Number of samples taken:	
FREE	66
TOTAL	0
Lowest single FREE chlorine reading	0.54
Lowest single TOTAL chlorine reading	0.00

Free Chlorine (for all disinfectants except chloramine)

Number of samples under 0.2 mg/L 0

Total Chlorine (when disinfectant is chloramine)

Number of samples under 0.5 mg/L

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Franklin W. Thurin II

Signature of Principal Executive Officer or Authorized Agent

08/03/11

Date

2011 SEP -8 PM 3:20

DIVISION OF WATER

KENTUCKY DIVISION OF WATER
DRINKING WATER BRANCH
MONTHLY OPERATION REPORT (MOR)--ALL WATER SYSTEMS

Revised 01/04/07

MONTH & YEAR (mm/yyyy): 08/2011

Indicate one with "X":
- [ ] SURFACE WATER
- [X] GROUNDWATER
- [ ] PURCHASE/DISTRIBUTE ONLY

DEP Form 4012--Revised 07/2006

PWS ID:	KY0210087	PLANT ID: A	PLANT NAME: Carrollton Water Treatment Plant
PWS NAME:	Carrollton Utilities	PLANT CLASS: III	DIST. CLASS: II
AGENCY INTEREST (AI):	696	DATE MAILED:	9/6/2011
SOURCE NAME:	Ohio River Alluvial Aquifer	COUNTY:	Carroll

	OPERATOR(S) RESPONSIBLE / IN-CHARGE	CLASS	CERTIFICATION NUMBER
WTP SHIFT 1:	Franklin W. Thieman II	IIA	19184
WTP SHIFT 2:	Chris Rose	IIA	19857
WTP SHIFT 3:			
DISTRIBUTION:	Larry Hayes	IID	9662

THIS REPORT MUST BE RECEIVED BY THE DIVISION OF WATER AND APPLICABLE FIELD OFFICE NO LATER THAN 10 DAYS AFTER THE END OF THE MONTH.

TREATMENT PLANTS COMPLETE:

1. DESIGN CAPACITY (gpm):	1040 gpm
2. TYPE OF FILTRATION USED:	Mixed Media
3. DESIGN FILTRATION RATE (gpm/sq. ft.):	Not to exceed 5gpm/sq.ft.
4. PERCENT BACKWASH WATER USED:	1.6
5. DATE FLOCCULATION BASIN(S) LAST CLEANED:	7/13/2011
6. DATE SETTLING BASIN(S) LAST CLEANED:	Claricone Unit

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. See KRS 224.99-010 and 401 KAR 8:020. (Penalties under this statute and regulation may include fines up to $25,000 per violation or by imprisonment for not more that one year, or both).

Franklin W. Thieman II — 9/4/2011

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT — DATE

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 09/2011
PAGE 1 OF 11

APPLICABLE TO ALL PLANTS

	RAW WATER TREATED	HOURS PLANT OPERATED	COAGULANT		COAGULANT Polymer		PH ADJUSTMENT CaO Lime Pre		DISINFECTANT Cl2 Chlorine Pre		DISINFECTANT Post	
DAY	GALLONS		LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1	945,000	15.1			255.0	32.4	1963.0	249.1	20.0	2.5		
2	938,000	15.0			254.0	32.5	1950.0	249.3	13.0	1.7		
3	883,000	14.5			245.0	33.3	1813.0	246.2	13.0	1.8		
4	901,000	14.8			250.0	33.3	1850.0	246.2	14.0	1.9		
5	938,000	15.3			275.0	35.2	2037.0	260.4	20.0	2.6		
6	898,000	15.0			253.0	33.8	1950.0	260.4	20.0	2.7		
7	905,000	15.0			253.0	33.5	1950.0	258.4	20.0	2.6		
8	1,075,000	16.7			283.0	31.6	2184.0	243.6	21.0	2.3		
9	958,000	15.3			259.0	32.4	1836.0	229.8	19.0	2.4		
10	980,000	15.7			266.0	32.5	1837.0	224.8	18.0	2.2		
11	919,000	14.3			241.0	31.4	1673.0	218.3	15.0	2.0		
12	942,000	15.0			253.0	32.2	1950.0	248.2	12.0	1.5		
13	949,000	15.1			255.0	32.2	1963.0	248.0	15.0	1.9		
14	959,000	15.4			261.0	32.6	1956.0	244.6	15.0	1.9		
15	847,000	14.1			239.0	33.8	1650.0	233.6	13.0	1.8		
16	989,000	15.9			269.0	32.6	1860.0	225.5	14.0	1.7		
17	960,000	15.6			264.0	33.0	1872.0	233.8	18.0	2.2		
18	937,000	15.0			254.0	32.5	1950.0	249.5	18.0	2.3		
19	968,000	13.7			231.0	28.6	1793.0	222.1	20.0	2.5		
20	766,000	14.1			239.0	36.5	1791.0	273.2	12.0	1.8		
21	914,000	15.0			254.0	33.3	1805.0	245.9	11.0	1.4		
22	1,139,000	18.2			308.0	32.5	2366.0	249.3	19.0	2.0		
23	1,032,000	16.2			274.0	31.8	2106.0	244.7	19.0	2.2		
24	916,000	14.5			245.0	32.1	1865.0	246.7	19.0	2.5		
25	922,000	14.6			247.0	32.1	1971.0	256.3	17.0	2.2		
26	888,000	14.2			240.0	32.4	1917.0	258.8	14.0	1.9		
27	879,000	15.2			257.0	35.1	1976.0	269.5	12.0	1.6		
28	866,000	14.0			237.0	32.8	1648.0	255.9	13.0	1.8		
29	915,000	14.7			249.0	32.6	1867.0	244.7	12.0	1.6		
30	916,000	15.0			254.0	33.2	1950.0	255.3	20.0	2.6		
31	842,000	13.5			228.0	32.5	1755.0	249.9	15.0	2.1		
TOTAL	28,905,000		0.0		7892.0		59374.0		501.0		0.0	
AVERAGE	932,419		#DIV/0!	#DIV/0!	254.6	32.8	1915.3	246.6	16.2	2.1	#DIV/0!	#DIV/0!
MAX	1,139,000											

NUMBER DAYS IN OPERATION 31

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 09/2011

	CHEMICALS ADDED													
	DISINFECTANT		FLUORIDE		CARBON		pH ADJUSTMENT Post		$KMnO_4$		CORROSION INHIBITOR			
DAY	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM	LBS	PPM
1			8.1	1.0										
2			7.8	1.0										
3			7.6	1.0										
4			7.8	1.0										
5			9.0	1.1										
6			7.8	1.0										
7			7.8	1.0										
8			9.0	1.0										
9			7.6	0.9										
10			9.2	1.1										
11			8.3	1.1										
12			8.7	1.1										
13			8.7	1.1										
14			8.5	1.1										
15			8.1	1.1										
16			9.0	1.1										
17			8.7	1.1										
18			8.7	1.1										
19			7.6	0.9										
20			7.6	1.2										
21			8.5	1.1										
22			10.4	1.1										
23			9.4	1.1										
24			8.7	1.1										
25			8.5	1.1										
26			8.1	1.1										
27			8.3	1.1										
28			8.3	1.1										
29			8.7	1.1										
30			9.0	1.2										
31			8.3	1.2										
TOTAL	0.0		261.8		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	8.4	1.1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210007
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 08/2011

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

DAY	pH			TOTAL ALKALINITY		TOTAL HARDNESS		CHLORINE RESIDUAL				TURBIDITY (NTU)		
								TOP OF FILTER		PLANT TAP				
	RAW	TOP OF FILTER	TAP	RAW	TAP	RAW	TAP	TOTAL	FREE	TOTAL	FREE	RAW	SETTLED WATER	PLANT TAP
1	6.90	8.40	8.00		78	442	182				1.40	0.03		0.02
2	6.90	8.40	7.90				180				0.90	0.02		0.02
3	7.00	8.20	8.00				190				1.10	0.02		0.02
4	7.00	8.30	8.00				174				1.10	0.02		0.02
5	7.00	8.70	8.00				184				1.10	0.02		0.02
6	6.90	8.40	7.90				176				1.10	0.02		0.02
7	6.90	8.50	8.00				174				1.10	0.03		0.02
8	6.90	8.40	8.00		80	460	178				1.20	0.03		0.02
9	7.00	8.00	8.00				168				1.20	0.02		0.03
10	7.00	8.50	8.00				192				1.10	0.02		0.03
11	7.00	8.20	8.10				182				1.20	0.03		0.02
12	7.00	8.50	8.00				184				1.20	0.03		0.02
13	6.90	8.30	7.90				176				1.20	0.03		0.02
14	7.00	8.40	8.00				180				1.20	0.02		0.02
15	7.00	8.10	7.90		78	432	184				1.10	0.05		0.03
16	7.00	8.50	7.70				178				1.10	0.04		0.03
17	7.00	8.30	7.90				182				1.20	0.04		0.05
18	7.00	8.40	7.90				182				1.20	0.05		0.05
19	6.90	8.40	7.80				190				1.10	0.04		0.03
20	6.90	8.40	8.00				186				0.80	0.03		0.03
21	7.00	8.30	8.00				186				1.20	0.03		0.04
22	7.00	8.40	7.90		72	430	180				1.10	0.05		0.03
23	7.00	8.60	7.90				210				1.20	0.04		0.03
24	7.00	8.40	7.90				218				1.10	0.02		0.03
25	7.00	8.60	8.00				200				1.10	0.03		0.04
26	6.90	8.60	8.00				168				1.20	0.05		0.03
27	7.00	8.10	8.00				204				0.90	0.04		0.03
28	7.00	8.60	7.80				200				1.10	0.04		0.03
29	7.00	8.40	8.10		96	460	200				1.00	0.03		0.03
30	7.00	8.60	7.90				200				1.10	0.04		0.03
31	7.00	8.50	8.00				180				1.10	0.02		0.03
AVERAGE	7.0	8.4	8.0	#DIV/0!	81	445	187	#DIV/0!	#DIV/0!	#DIV/0!	1.12	0.03	#DIV/0!	0.03

OPTIONAL INFORMATION--Surface Water Plants Only

KENTUCKY DIVISION OF WATER
DRINKING WATER BRANCH
WATER TREATMENT PLANT MONTHLY OPERATION REPORT

PWS ID : KY0210067
PLANT ID: A
AGENCY INTEREST: 696
REPORT MONTH/YEAR: 08/2011

AREA-WIDE OPTIMIZATION PROGRAM TURBIDITY DATA

COPY PAGE AS NEEDED

ANALYTICAL RESULTS (NTU)															
DAY	RAW DAILY MAXIMUM	SEDIMENTATION BASIN EFFLUENT DAILY MAXIMUM						INDIVIDUAL FILTER EFFLUENT DAILY MAXIMUM							CFE DAILY MAXIMUM
		#1	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#6	#7	
1	0.03	0.08						0.02	0.03						0.03
2	0.02	0.07						0.02	0.03						0.03
3	0.02	0.14						0.03	0.05						0.05
4	0.02	0.25						0.05	0.04						0.05
5	0.02	0.07						0.04	0.04						0.04
6	0.02	0.08						0.02	0.03						0.03
7	0.03	0.07						0.02	0.03						0.03
8	0.03	0.08						0.02	0.03						0.03
9	0.04	0.13						0.03	0.03						0.03
10	0.04	0.11						0.03	0.04						0.04
11	0.04	0.12						0.04	0.05						0.05
12	0.03	0.09						0.02	0.03						0.03
13	0.03	0.08						0.02	0.03						0.03
14	0.03	0.07						0.02	0.03						0.03
15	0.05	0.15						0.04	0.03						0.04
16	0.04	0.10						0.04	0.03						0.04
17	0.05	0.11						0.04	0.04						0.04
18	0.05	0.10						0.04	0.03						0.04
19	0.04	0.09						0.03	0.03						0.03
20	0.03	0.07						0.03	0.04						0.04
21	0.03	0.17						0.04	0.03						0.04
22	0.05	0.09						0.04	0.03						0.04
23	0.03	0.09						0.04	0.03						0.04
24	0.03	0.09						0.03	0.03						0.03
25	0.03	0.08						0.04	0.03						0.04
26	0.05	0.07						0.03	0.02						0.03
27	0.07	0.09						0.05	0.03						0.05
28	0.03	0.09						0.05	0.03						0.05
29	0.03	0.09						0.04	0.02						0.04
30	0.04	0.10						0.04	0.02						0.04
31	0.03	0.08						0.02	0.02						0.02
AVERAGE	0.0	0.1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.03	0.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.04

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWSID: KY0210067
PLANT ID: A

APPLICABLE TO ALL PLANTS

REPORT MONTH/YEAR: 08/2011

*Please answer Y/N question below this chart.

ANALYTICAL RESULTS (mg/L OR PPM UNLESS OTHERWISE SPECIFIED)

	FLUORIDE		IRON		MANGANESE				Lowest Daily Chlorine Residual Plant Tap On-Line Chlorine Analyzer	RAINFALL	WATER TEMP. DEGREES
DAY	RAW	TAP	RAW	TAP	RAW	TAP	RAW	TAP	FREE / TOTAL	INCHES	F°/C°
1	0.30	0.90	0.09	0.06		0.18			1.44	0.0	16.0
2	0.28	1.00							0.90	0.0	16.0
3	0.30	1.10							1.09	0.2	16.0
4	0.37	1.10							1.19	0.0	16.0
5	0.12	1.00							1.04	0.0	16.0
6	0.20	1.00							1.12	0.0	16.0
7	0.20	1.00							1.14	0.5	16.0
8	0.16	1.00	0.09	0.04		0.03			1.17	0.0	16.0
9	0.40	1.00							1.10	0.3	16.0
10	0.30	1.00							1.16	0.0	16.0
11	0.30	1.20							1.22	0.0	16.0
12	0.06	0.60							1.19	0.0	16.0
13	0.10	0.90							1.20	0.4	16.0
14	0.10	0.90							1.20	0.6	16.0
15	0.10	1.00	0.16	0.02		0.03			1.18	0.0	16.0
16	0.10	1.10							1.11	0.0	16.0
17	0.20	1.00							1.09	0.0	16.0
18	0.35	1.20							1.07	0.5	16.0
19	0.34	1.10							1.16	0.0	16.0
20	0.30	0.70							1.16	0.0	16.0
21	0.10	1.00							1.00	0.1	16.0
22	0.30	1.10	0.08	0.02		0.03			1.18	0.0	16.0
23	0.40	1.20							1.08	0.0	16.0
24	0.10	0.90							1.07	0.0	16.0
25	0.29	1.10							1.15	0.0	16.0
26	0.29	1.20							1.04	0.0	16.0
27	0.16	1.10							1.00	0.0	16.0
28	0.16	0.90							1.11	0.0	16.0
29	0.27	1.10	0.16	0.16		0.02			0.98	0.0	16.0
30	0.47	1.20							1.06	0.0	16.0
31	0.30	1.10							1.06	0.0	16.0
AVERAGE	0.24	1.02	0.12	0.06	#DIV/0!	0.06	#DIV/0!	#DIV/0!	Monthly Minimum	Total Rainfall	16.0
									0.90		
									Number of readings 31	2.55	
									For Free Chlorine, # less than 0.2 mg/L 0		
									For Chloramines, # less than 0.5 mg/L		

Disinfectant Chloramines? (Y/N) N

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL PLANTS WITH FILTRATION

PWS ID : KY0210067
PLANT ID: A
REPORT MONTH/YEAR: 08/2011

DAY	TOTAL WASH WATER GALLONS	FILTER OPERATION No: 1 AREA (square feet) WASHWATER GALLONS	FILT RUN HRS	No: 2 AREA (square feet) WASHWATER GALLONS	FILT RUN HRS	No: AREA (square feet) WASHWATER GALLONS	FILT RUN HRS	No: AREA (square feet) WASHWATER GALLONS	FILT RUN HRS	No: AREA (square feet) WASHWATER GALLONS	FILT RUN HRS
1	0		15.10		15.10						
2	55,200		15.00	55,200	14.50						
3	0		14.50		14.50						
4	48,000	48,000	14.30		14.80						
5	0		15.30		15.30						
6	0		15.00		15.00						
7	0		15.00		15.00						
8	0		16.70		16.70						
9	48,000		15.30	48,000	14.80						
10	0		15.70		15.70						
11	0		14.30		14.30						
12	0		15.00		15.00						
13	52,800	52,800	14.60		15.10						
14	0		15.40		15.40						
15	0		14.10		14.10						
16	48,000		15.90	48,000	15.40						
17	0		15.60		15.60						
18	0		15.00		15.00						
19	52,800	52,800	13.20		13.70						
20	0		14.10		14.10						
21	0		15.00		15.00						
22	0		16.20		16.20						
23	0		16.20		16.20						
24	0		14.50		14.50						
25	50,400		14.60	50,400	14.10						
26	0		14.20		14.20						
27	48,000	48,000	14.70		15.20						
28	0		14.00		14.00						
29	0		14.70		14.70						
30	48,000		15.00	48,000	14.50						
31	0		13.50		13.50						
TOTAL	451,200	201,600	463.70	249,600	463.20	0	0.00	0	0.00	0	0.00
AVERAGE	14,555	50,400	14.958	49,920	14.942	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

COPY AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210007
PLANT ID: A

ALL WATER SYSTEMS

REPORT MONTH/YEAR: 08/2011

	DISTRIBUTION SYSTEM OPERATION											
	CHEMICALS ADDED			TEST RESULTS								
	CHLORINE BOOSTER	CHLORINE BOOSTER		TOTAL (T) AND FREE (F) CHLORINE RESIDUAL (ppm)								
	NORTH			SOUTH				EAST		WEST		
DAY	LBS	LBS		T	F	T	F	T	F	T	F	
1					1.00		0.90					
2									0.90		1.00	
3					0.50		0.70					
4									1.00		1.20	
5					1.20		1.00					
6									0.80		0.90	
7					1.10		0.80					
8									0.70		0.80	
9					1.00		0.80					
10									1.10		1.10	
11					1.30		1.00					
12									0.70		0.80	
13					1.20		0.90					
14									0.80		0.90	
15					1.10		1.10					
16									1.10		1.10	
17					1.20		0.90					
18									1.00		1.00	
19					0.60		0.90					
20									0.60		0.90	
21					1.20		1.00					
22									0.90		0.50	
23					1.20		0.90					
24									0.70		0.80	
25					0.60		0.90					
26									1.00		1.10	
27					1.10		1.00					
28									1.00		1.10	
29					0.80		1.00					
30									0.60		1.00	
31					1.10		0.90					
AVERAGE	#DIV/0!	#DIV/0!	Average	#DIV/0!	1.01	#DIV/0!	0.93	#DIV/0!	0.86	#DIV/0!	0.94	
TOTAL	0.0	0.0	Total Minimum									
			Free Minimum		0.50		0.70		0.60		0.50	
			Total # Chlorine Samples	0	15	0	15	0	15	0	15	
			# Less than 0.2 mg/L/0.5 mg/L	0	0	0	0	0	0	0	0	

Number of Free Residuals	62	Minimum Monthly Free Residual	0.50
Number of Total Residuals	0	Minimum Monthly Total Residual	0.00
Total # Less than 0.2 mg/L	0		
Total # Less than 0.5 mg/L			

Disinfectant Chloramines? (Y/N): N

Number of days of operation?: 31

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210037
PLANT ID: A

TURBIDITY REPORT

APPLICABLE TO ALL PLANTS WITH FILTRATION

Report Period (MM/YYYY): 08/2011

PWS Name: Carrollton Utilities

DAY	Hours Plant Operated	# of Turbidity Samples Required	Mid - 4 am	4 am - 8 am	8 am - Noon	Noon - 4 pm	4 pm - 8 pm	8 pm - Mid	Daily Maximum
1	15.1	4		0.02	0.02	0.03	0.02		0.030
2	15.0	4		0.02	0.02	0.02	0.02		0.020
3	14.5	4		0.02	0.02	0.02	0.02		0.020
4	14.8	4		0.02	0.02	0.02	0.02		0.020
5	15.3	4		0.02	0.02	0.02	0.02		0.020
6	15.0	4		0.02	0.02	0.02	0.02		0.020
7	15.0	4		0.02	0.02	0.02	0.02		0.020
8	16.7	5		0.02	0.02	0.03	0.02	0.02	0.030
9	15.3	4		0.03	0.03	0.03	0.03		0.030
10	15.7	4		0.03	0.03	0.04	0.03		0.040
11	14.8	4		0.02	0.02	0.04	0.04		0.040
12	15.0	4		0.02	0.02	0.02	0.02		0.020
13	15.1	4		0.02	0.02	0.02	0.02		0.020
14	15.4	4		0.02	0.02	0.02	0.02		0.020
15	14.1	4		0.05	0.05	0.03	0.03		0.050
16	15.9	4		0.03	0.03	0.03	0.03		0.030
17	15.6	4		0.05	0.05	0.04	0.04		0.050
18	15.0	4		0.05	0.05	0.05	0.04		0.050
19	13.7	4		0.03	0.03	0.04	0.03		0.040
20	14.1	4		0.03	0.03	0.03	0.03		0.030
21	15.0	4		0.04	0.04	0.02	0.02		0.040
22	18.2	5		0.02	0.02	0.03	0.03	0.03	0.030
23	16.2	5		0.04	0.04	0.03	0.03	0.03	0.040
24	14.5	4		0.03	0.03	0.02	0.03		0.030
25	14.6	4		0.04	0.04	0.03	0.03		0.040
26	14.2	4		0.03	0.03	0.04	0.02		0.040
27	15.2	4		0.04	0.04	0.03	0.04		0.040
28	14.0	4		0.04	0.04	0.04	0.04		0.040
29	14.7	4		0.03	0.03	0.03	0.03		0.030
30	15.0	4		0.03	0.03	0.03	0.03		0.030
31	13.5	4		0.03	0.03	0.03	0.03		0.030
Total	465.7	127					TOTAL # OF TURBIDITY SAMPLES TAKEN →	127	0.050

ARE YOU USING EITHER CONVENTIONAL or DIRECT FILTRATION? (Y/N) Y
(Any type of filtration besides slow sand)

Number of samples exceeding → 0.1 NTU 0 0.3 NTU 0 1 NTU 0

For slow sand filtration, the number of samples exceeding → 1 NTU _____ 5 NTU _____

*NOTE: The "Number of Turbidity Samples Required" is the number of hours the plant operated divided by 4 rounded up to the next whole number.

I certify that the above turbidity readings were taken every 4 hours during plant operation and in the time frames noted above.

Signature of Principal Executive Officer or Authorized Agent

9/4/11
Date

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

APPLICABLE TO ALL SURFACE WATER PLANTS WITH FILTRATION

INDIVIDUAL FILTER TURBIDITY EXCEEDANCE REPORT

PWS Name: Carrollton Utilities

PWS ID: KY0210067

PLANT ID: A

Report Period (MM/YYYY): 06/2011

If any filter exceeded any one of the individual filter turbidity triggers below, (also listed on the Summary Sheet), complete the following and submit the appropriate report(s).

Date	Filter Number	Turbidity Reading (NTU)	Trigger Level (see below)	Reason for Exceedance (if known)	Date and Time State was Contacted

Trigger Levels:

A. Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart.

B. Any one filter has a measured turbidity level of greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of operation following a backwash or return to service.

C. Any one filter has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 3 consecutive months.

D. Any one filter has a measured turbidity level of greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 2 consecutive months.

Report Required:

For Trigger A.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger B.: Filter number, the turbidity measurement, the date of exceedance and filter profile within 7 days of the exceedance, if no obvious reason for the exceedance

For Trigger C.: Filter number, the turbidity measurement, the date of exceedance and a filter self-assessment within 14 days of the exceedance

For Trigger D.: Filter number, the turbidity measurement, the date of exceedance and arrange for a Comprehensive Performance Evaluation (CPE) with the Drinking Water Branch no later than 30 days following the exceedance

MAKE COPIES AS NEEDED

KENTUCKY DIVISION OF WATER - DRINKING WATER BRANCH
WATER TREATMENT PLANT - MONTHLY OPERATING REPORT

PWS ID : KY0210007
PLANT ID: A
REPORT MONTH/YEAR: 03/2011

APPLICABLE TO ALL PLANTS

COLUMN HEADINGS MAY BE CHANGED BASED UPON DATA

	ADDITIONAL DATA													
DAY														
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
TOTAL	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
AVERAGE	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) PLANT SUMMARY FORM

PWS ID KY0210067 MONITORING PERIOD (MMYYYY) 06/2011

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PLANT INFORMATION
APPLICABLE TO ALL PLANTS

PLANT ID	A	TOTAL WATER TREATED (gallons)	28,905,000
PLANT NAME	Carrollton Water Treatment Plant	AVE. DAILY PRODUCTION (gallons)	932,419
AGENCY INTEREST	698	MAXIMUM PUMPAGE (gallons per day)	1,138,000

INDIVIDUAL FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE 0100

Was each filter monitored continuously? (Y/N)	Y
Were measurements recorded every 15 minutes? (Y/N)	Y
Was there a failure of the continuous monitoring equipment? (Y/N)	N
If Yes, (1) were individual filter effluent turbidity grab samples collected every four hours of operation? (Y/N)	Y
(2) was the continuously monitoring equipment repaired within 5 working days? (Y/N)	
Was individual filter level greater than 1.0 NTU in two consecutive measurements? (Y/N)	N
Was individual filter level greater than 0.5 NTU in two consecutive measurements after on line for more than four hours? (Y/N)	N
Was individual filter level greater than 1.0 NTU in two consecutive measurements in three consecutive months? (Y/N)	N
Was individual filter level greater than 2.0 NTU in two consecutive measurements in two consecutive months? (Y/N)	N

If any of the last 4 boxes are YES, fill out the Individual Filter Turbidity Sheet and submit with the MOR

COMBINED FILTER EFFLUENT TURBIDITY
APPLICABLE TO ALL PLANTS WITH FILTRATION

ANALYTE CODE 0100

Number of hours of plant operation	465.7
Were samples taken every 4 hours of plant operation? (Y/N)	Y
Number of samples taken	127
Highest single turbidity reading	0.05
For all filtration except slow sand filtration:	
Number of samples exceeded 0.1 NTU	0
Number of samples exceeded 0.3 NTU	0
Number of samples exceeded 1 NTU	0
When filtration is slow sand filtration:	
Number of samples exceeded 1 NTU	
Number of samples exceeded 5 NTU	

ENTRY POINT RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL PLANTS

ANALYTE CODE 0999

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	Y
Number of lowest chlorine samples recorded	31
Lowest single chlorine reading	0.90
If less than required:	
Was residual restored within 4 hours of plant operation? (Y/N)	
Free Chlorine (for all disinfectants except chloromine):	
Number of samples under 0.2 mg/L	0
Total Chlorine (when disinfectant is Chloramine):	
Number of samples under 0.5 mg/L	

CHLORINE DIOXIDE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE 1008

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorine dioxide reading	0.00
Number of chlorine dioxide samples exceeded 0.8 mg/L	0

CHLORITE ENTRY POINT MONITORING
APPLICABLE TO PLANTS UTILIZING CHLORINE DIOXIDE

ANALYTE CODE 1009

Number of days of plant operation	31
Were samples taken each day of operation? (Y/N)	
Number of samples taken	0
Highest single chlorite reading	0.00
Number of chlorite samples exceeded 1 mg/L	0

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 5 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Franklin W. Thomas II — Signature of Principal Executive Officer or Authorized Agent

08/04/11 — Date

KENTUCKY DIVISION OF WATER / DRINKING WATER BRANCH
MONTHLY OPERATING REPORT (MOR) SUMMARY FORM

PWS ID KY0210067 MONITORING PERIOD (MMYYYY) 06/2011

AI 696

NOTE: COMPLETE ALL APPLICABLE FIELDS!!! NOT ALL OF THE FIELDS ARE PRE-POPULATED FOR YOU!!!

PURCHASED		SOLD	
APPLICABLE TO ALL WATER SYSTEMS			
FROM WHOM? (PWS ID)	HOW MUCH? (gallons)	TO WHOM? (PWS ID)	HOW MUCH? (gallons)
		KY0210008	7,433,873
		KY0210066	0

DISTRIBUTION RESIDUAL DISINFECTANT CONCENTRATION
APPLICABLE TO ALL WATER SYSTEMS

ANALYTE CODE 0999

Number of days of operation	31
Were samples taken each day of operation? (Y/N)	Y
Number of samples taken:	
FREE	62
TOTAL	0
Lowest single FREE chlorine reading	0.50
Lowest single TOTAL chlorine reading	0.00

Free Chlorine (for all disinfectants except chloramine)
Number of samples under 0.2 mg/L 0

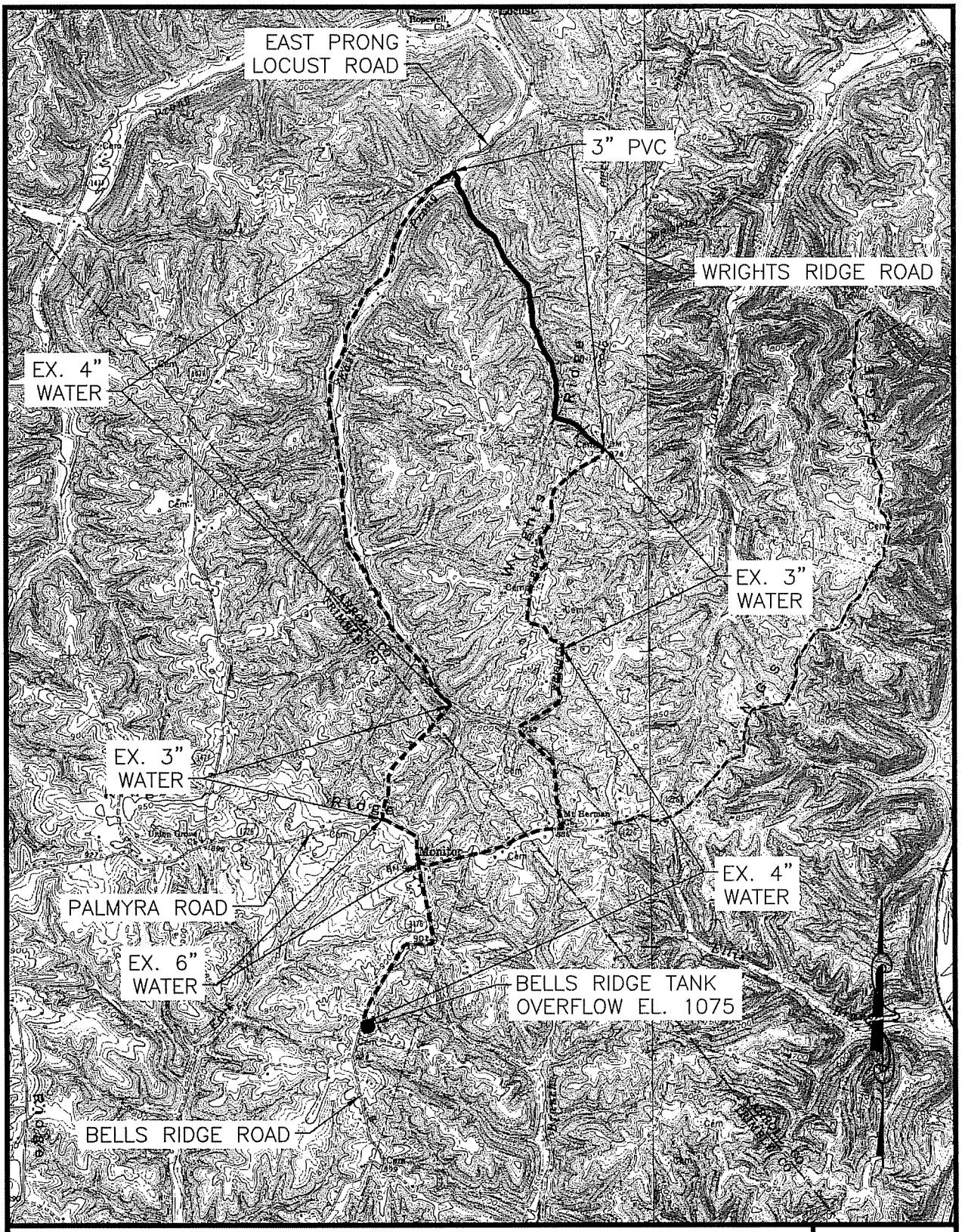
Total Chlorine (when disinfectant is chloramine)
Number of samples under 0.5 mg/L

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to $25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Signature of Principal Executive Officer or Authorized Agent

06/04/11
Date

APPENDIX B
HYDRAULIC ANALYSIS OF LINE EXTENSIONS



LINE A

PAINTER'S RIDGE WATERLINE EXTENSION

USGS QUAD MAP MADISON EAST & CARROLLTON

DISTRIBUTION SYSTEM IMPROVEMENTS

CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT

CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 1

5104.003

File: S:\LOU\5100--5199\5104\003\Acad\Hydraulics.dwg Time: Jul 05, 2012 - 9:06am

MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

Painter's Branch - Service from Palmyra Road

# of Customers	25
Flow (D.R. Taylor)	48 gpm
Supply Tank Overflow Elevation (ft)	1,065 ft
Peak Elevation (ft) for New 3" Line	875 ft

Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									1065.00	
Ex. 4" Line	4,245	4,245	4.0	12.6	140	1.70	7.20	7.20	1057.80	1.23
Ex. 6" Line	1,325	5,570	6.0	28.3	140	0.24	0.31	7.51	1057.49	0.54
Ex. 3" Line	2,855	8,425	3.0	7.1	140	6.87	19.63	27.14	1037.86	2.18
Ex. 4" Line	12,535	20,960	4.0	12.6	140	1.70	21.26	48.39	1016.61	1.23
New 3" Line	6,825	27,785	3.0	7.1	140	6.87	46.92	95.31	969.69	2.18
Cumulative		27,785								

Minimum Pressure (psi) **41**

= Enter data in shaded cells.

Painter's Branch - Flushing Velocity from Palmyra Road						
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data				
Water Elevation (ft) with Bells Ridge Tank down 10 ft.		1065.0				
Headloss (ft) from tank through looped sections		0				
High Point (ft)		945.0	930.0	930.0	715.0	875.0
Supply Main Data		Ex. 4" Line	Ex. 6" Line	Ex. 3" Line	Ex. 4" Line	New 3" Line
Diameter (in)		4.0	6.0	3.0	4.0	3.0
Length (ft)		4,245	1,325	2,855	12,535	6,825
C Factor		140	140	140	140	140
Flow (gpm)		60	60	60	60	60
Headloss/1000'		2.6	0.4	10.4	2.6	10.4
Headloss (ft)		10.8	0.5	29.6	32.0	70.7
∑ Headloss (ft)		10.8	11.3	40.9	72.9	143.6
HGL @ High Point (ft)		1054.2	1053.7	1024.1	992.1	921.4
Estimated Fireflow Data						
Static (ft)		120.0	135.0	135.0	350.0	190.0
Static (psi)		52.0	58.5	58.5	151.7	82.3
Residual (psi)		**20.0**	**20.0**	**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2	46.2	46.2
Residual Elevation (ft)		991.2	976.2	976.2	761.2	921.2
Head Differential (ft)		63.0	77.5	48.0	231.0	0.3
Flow (gpm)		**877**	**973**	**765**	**1,679**	**60**
Nozzle (in)		2.5	2.5	2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90	0.90	0.90
Velocity (ft/sec)		**1.5**	**0.7**	**2.7**	**1.5**	**2.7**

MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

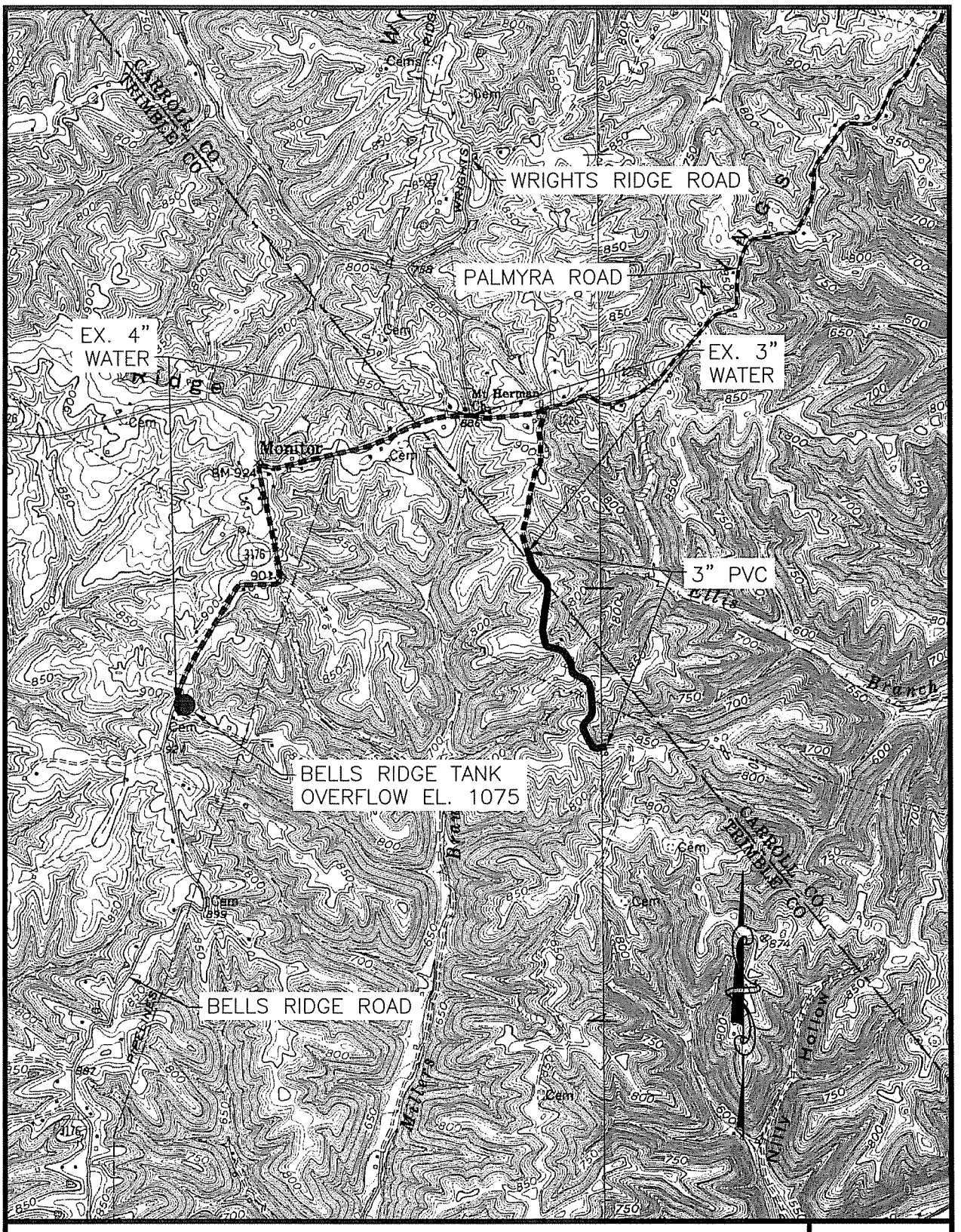
Painter's Branch - Service from Wright's Ridge Road

# of Customers	25
Flow (D.R. Taylor)	48 gpm
Supply Tank Overflow Elevation (ft)	1,065 ft
Peak Elevation (ft) for New 3" Line	875 ft

Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									1065.00	
Ex. 4" Line	11,780	11,780	4.0	12.6	140	1.70	19.97	19.97	1045.03	1.23
Ex. 3" Line	5,265	17,045	3.0	7.1	140	6.87	36.19	56.17	1008.83	2.18
New 3" Line	6,825	23,870	3.0	7.1	140	6.87	46.92	103.08	961.92	2.18
Cumulative		23,870								
Minimum Pressure (psi)	**38**									

= Enter data in shaded cells.

Painter's Branch - Flushing Velocity from Wright's Ridge Road				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Water Elevation (ft) with Bells Ridge Tank down 10 ft.		1065.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		945.0	922.0	875.0
Supply Main Data		Ex. 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		11,780	5,265	6,825
C Factor		140	140	140
Flow (gpm)		57	57	57
Headloss/1000'		2.4	9.6	9.6
Headloss (ft)		27.8	50.4	65.3
∑ Headloss (ft)		27.8	78.2	143.6
HGL @ High Point (ft)		1037.2	986.8	921.4
Estimated Fireflow Data				
Static (ft)		120.0	143.0	190.0
Static (psi)		52.0	62.0	82.3
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		991.2	968.2	921.2
Head Differential (ft)		46.0	18.6	0.3
Flow (gpm)		**749**	**477**	**57**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		**1.5**	**2.6**	**2.6**



LINE B

RD KENDALL WATERLINE EXTENSION

USGS QUAD MAP MADISON EAST & CARROLLTON

DISTRIBUTION SYSTEM IMPROVEMENTS

CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT

CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 2

5104.003

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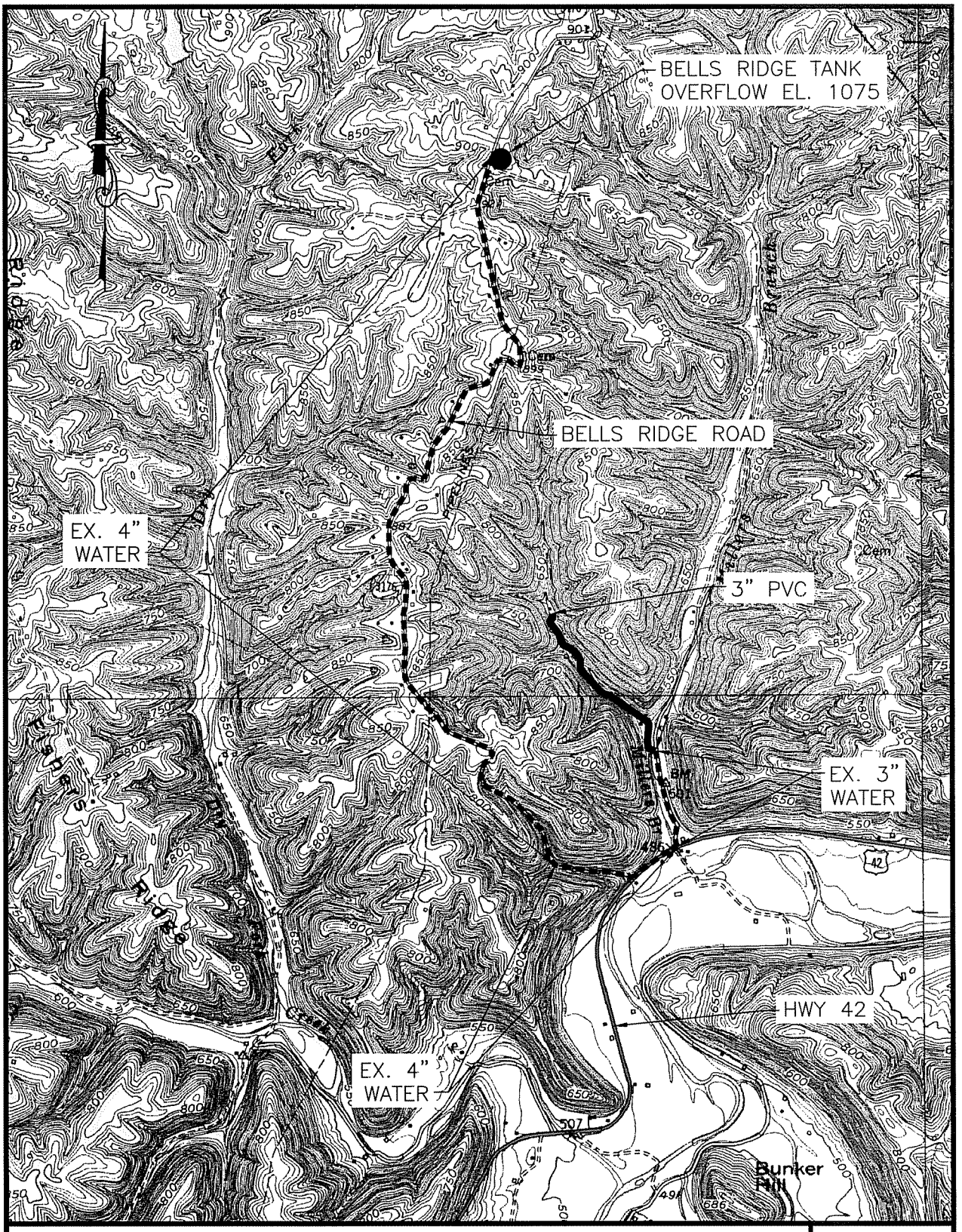
MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

RD Kendall

								# of Customers	25	
								Flow (D.R. Taylor)	48	gpm
								Supply Tank Overflow Elevation (ft)	1,065	ft
								Peak Elevation (ft) for New 3" Line	890	ft
Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									1065.00	
Ex. 4" Line	7,305	7,305	4.0	12.6	140	1.70	12.39	12.39	1052.61	1.23
Ex. 3" Line	3,105	10,410	3.0	7.1	140	6.87	21.34	33.73	1031.27	2.18
New 3" Line	4,500	14,910	3.0	7.1	140	6.87	30.93	64.67	1000.33	2.18
Cumulative		14,910								
Minimum Pressure (psi)	**48**									

= Enter data in shaded cells.

RD Kendall				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Water Elevation (ft) with Bells Ridge Tank down 10 ft.		1065.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		945.0	925.0	890.0
Supply Main Data		Ex. 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		7,305	3,105	4,500
C Factor		140	140	140
Flow (gpm)		70	70	70
Headloss/1000'		3.4	13.7	13.7
Headloss (ft)		24.6	42.4	61.4
∑ Headloss (ft)		24.6	67.0	128.4
HGL @ High Point (ft)		1040.4	998.0	936.6
Estimated Fireflow Data				
Static (ft)		120.0	140.0	175.0
Static (psi)		52.0	60.7	75.8
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		991.2	971.2	936.2
Head Differential (ft)		49.2	26.8	0.4
Flow (gpm)		**775**	**572**	**70**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		1.8	3.2	3.2



LINE C
MILLER'S BRANCH WATERLINE EXTENSION

USGS QUAD MAP MADISON EAST & BEDFORD
DISTRIBUTION SYSTEM IMPROVEMENTS
CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT
CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 3

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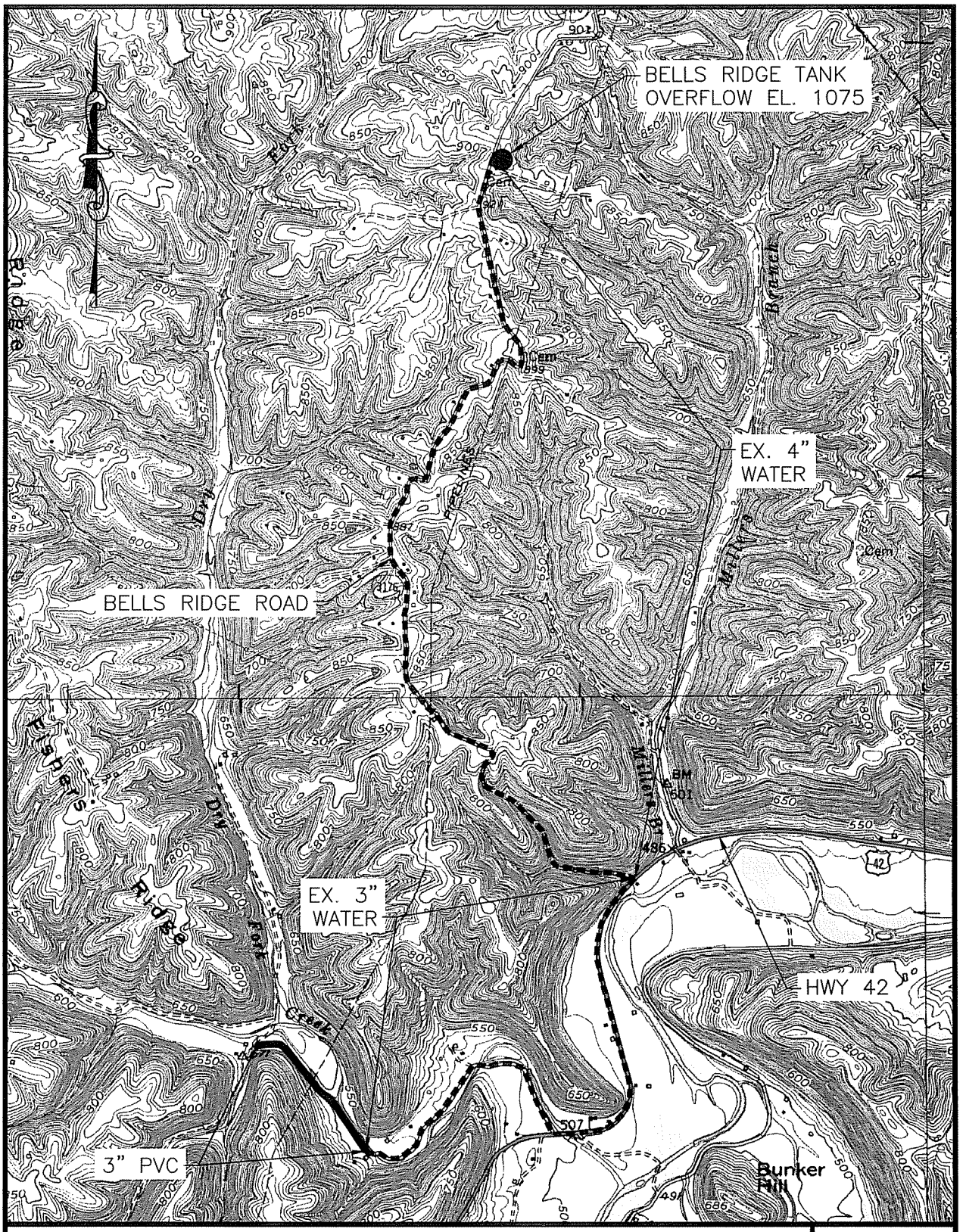
MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

Miller's Branch

								# of Customers	48	
								Flow (D.R. Taylor)	25	gpm
								Supply Tank Overflow Elevation (ft)	1,065	ft
								Peak Elevation (ft) for New 3" Line	590	ft
Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									1065.00	
Ex. 4" Line	14,375	14,375	4.0	12.6	140	0.51	7.29	7.29	1057.71	0.64
Ex. 3" Line	1,405	15,780	3.0	7.1	140	2.06	2.89	10.18	1054.82	1.13
New 3" Line	1,600	17,380	3.0	7.1	140	2.06	3.29	13.47	1051.53	1.13
Cumulative		17,380								
Minimum Pressure (psi)	**200**									

= Enter data in shaded cells.

Miller's Branch				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Water Elevation (ft) with Bells Ridge Tank down 10 ft.		1065.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		922.0	505.0	590.0
Supply Main Data		Ex. 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		14,375	1,405	1,600
C Factor		140	140	140
Flow (gpm)		162	162	162
Headloss/1000'		16.1	65.1	65.1
Headloss (ft)		231.0	91.5	104.2
∑ Headloss (ft)		231.0	322.5	426.7
HGL @ High Point (ft)		834.0	742.5	638.3
Estimated Fireflow Data				
Static (ft)		143.0	560.0	475.0
Static (psi)		62.0	242.7	205.8
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		968.2	551.2	636.2
Head Differential (ft)		-134.1	191.4	2.1
Flow (gpm)		**#NUM!**	**1,528**	**162**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		**4.1**	**7.3**	**7.3**



LINE D
HARDY CREEK WATERMAIN
USGS QUAD MAP MADISON EAST & BEDFORD
DISTRIBUTION SYSTEM IMPROVEMENTS
CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT
CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 4

5104.003

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MINIMUM PRESSURE CALCULATION FOR New 3" Line

Hardy Creek

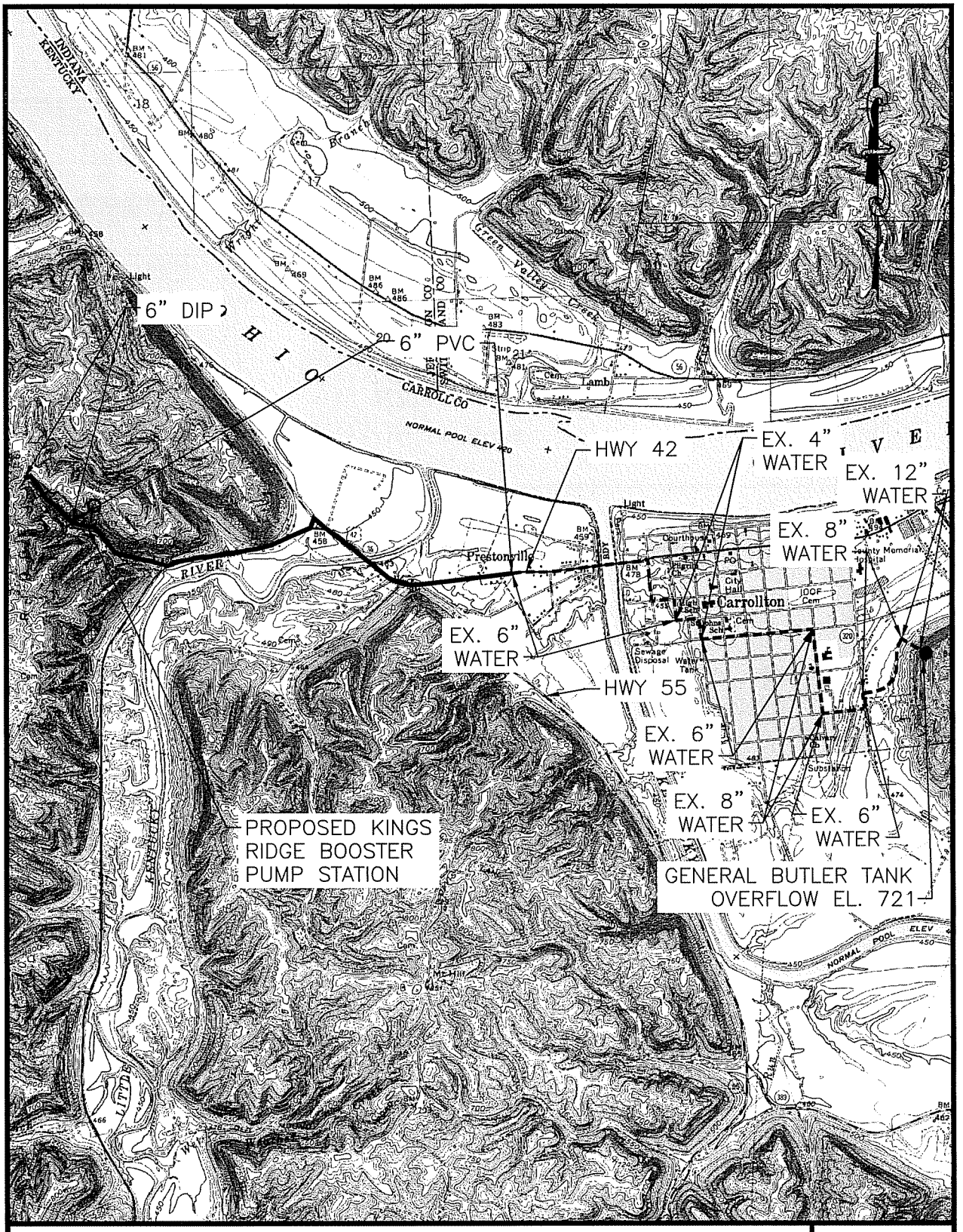
# of Customers	25
Flow (D.R. Taylor)	48 gpm
Supply Tank Overflow Elevation (ft)	1,065 ft
Peak Elevation (ft) for New 3" Line	570 ft

Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
									1065.00	
Supply Line										
Ex. 4" Line	13,620	13,620	4.0	12.6	140	1.70	23.09	23.09	1041.91	1.23
Ex. 3" Line	8,560	22,180	3.0	7.1	140	6.87	58.84	81.94	983.06	2.18
New 3" Line	2,380	24,560	3.0	7.1	140	6.87	16.36	98.30	966.70	2.18
Cumulative		24,560								

Minimum Pressure (psi) **172**

= Enter data in shaded cells.

Hardy Creek				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Water Elevation (ft) with Bells Ridge Tank down 10 ft.		1065.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		922.0	540.0	570.0
Supply Main Data		Ex. 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		13,620	8,560	2,380
C Factor		140	140	140
Flow (gpm)		109	109	109
Headloss/1000'		7.7	31.3	31.3
Headloss (ft)		105.2	268.1	74.5
∑ Headloss (ft)		105.2	373.3	447.9
HGL @ High Point (ft)		959.8	691.7	617.1
Estimated Fireflow Data				
Static (ft)		143.0	525.0	495.0
Static (psi)		62.0	227.5	214.5
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		968.2	586.2	616.2
Head Differential (ft)		-8.4	105.5	1.0
Flow (gpm)		**#NUM!**	**1,135**	**109**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		2.8	4.9	4.9



LINE E
US 36/KY 42 & KINGS RIDGE RD WATERMAIN EXTENSION

USGS QUAD MAP CARROLLTON

DISTRIBUTION SYSTEM IMPROVEMENTS

CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT

CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 5

5104.003

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DISCHARGE SIDE

Flow **40** gpm

ELEV. BELLS RIDGE TANK 1075 ft

Line	Length (ft)	CUMUL. Length (ft)	Pipe Size (in)	Area (sq in)	C	HL /1000'	HL (ft)	CUMUL. HL (ft)	H.G.L. (ft)	V (ft/s)
		24,445								
	0	24,445	0.0	0.0	140			4.56	706.44	
	0	24,445	0.0	0.0	140					
Prop. 6" Water Main	2,020	26,465	6.0	28.3	140	0.17	0.34	4.90	1070.10	0.45
Ex. 3" Water Main	16,265	42,730	3.0	7.1	140	4.91	79.80	84.70	990.30	1.82
Ex. 3" Water Main	3,435	46,165	3.0	7.1	140	4.91	16.85	101.55	973.45	1.82
									1171.99	
									1075.00	
							101.55			
				Static Head			364.00			
							465.548			

SUCTION SIDE

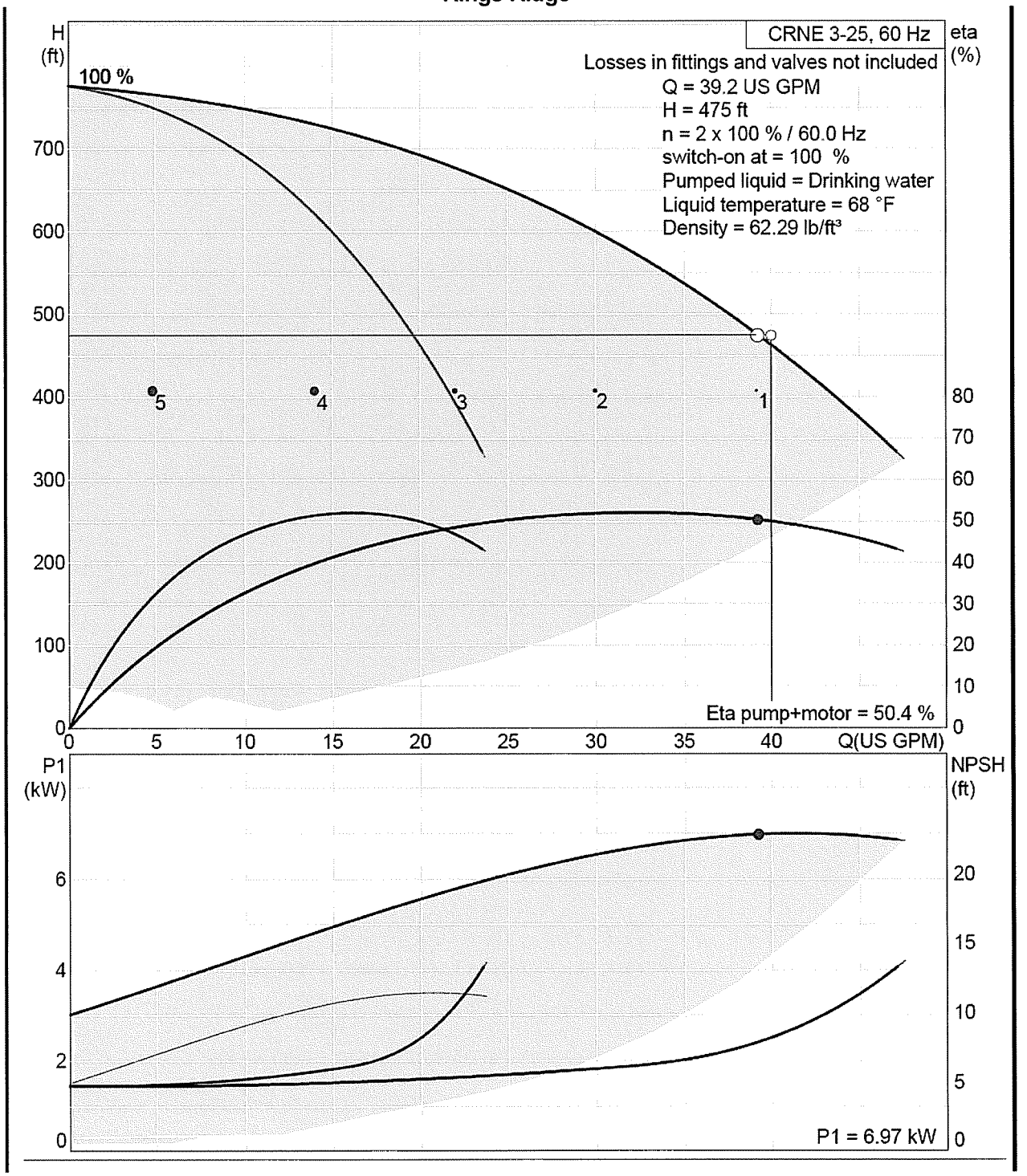
Flow **40** gpm

ELEV. GENERAL BUTLER TANK 711 ft

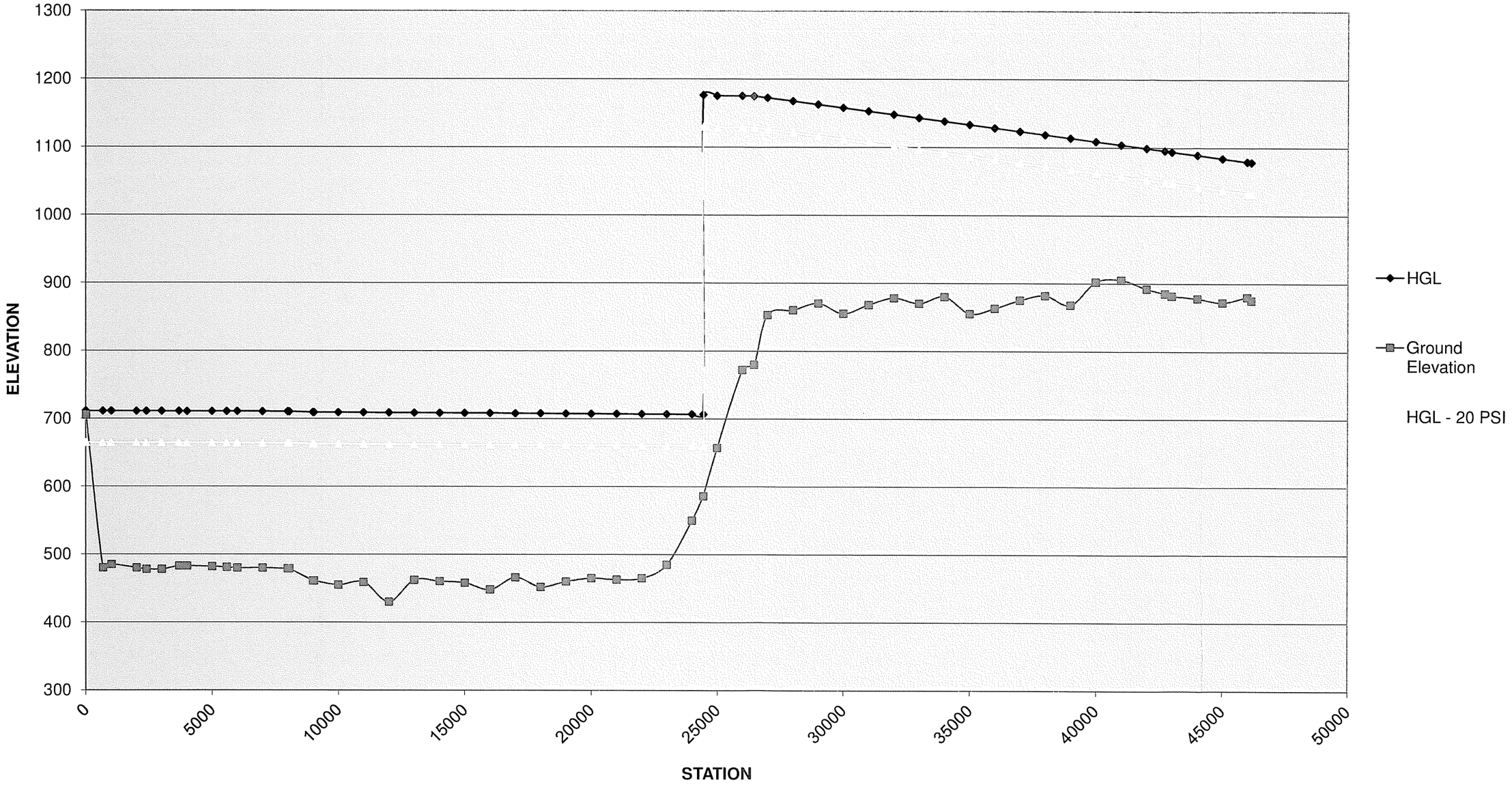
Line	Length (ft)	CUMUL. Length (ft)	Pipe Size (in)	Area (sq in)	C	HL /1000'	HL (ft)	CUMUL. HL (ft)	H.G.L. (ft)	V (ft/s)
Ex. 12" Water Main	670	670	12.0	113.1	140	0.01	0.00	0.00	711.00	0.11
Ex. 8" Water Main	1,720	2,390	8.0	50.3	140	0.04	0.07	0.08	710.92	0.26
Ex. 6" Water Main	1,290	3,680	6.0	28.3	140	0.17	0.22	0.29	710.71	0.45
Ex. 8" Water Main	1,900	5,580	8.0	50.3	140	0.04	0.08	0.37	710.63	0.26
Ex. 6" Water Main	2,485	8,065	6.0	28.3	140	0.17	0.42	0.79	710.21	0.45
Ex. 4" Water Main	970	9,035	4.0	12.6	140	1.21	1.17	1.96	709.04	1.02
Ex. 6" & Prop. 6"Water Main	15,410	24,445	6.0	28.3	140	0.17	2.59	4.56	706.44	0.45

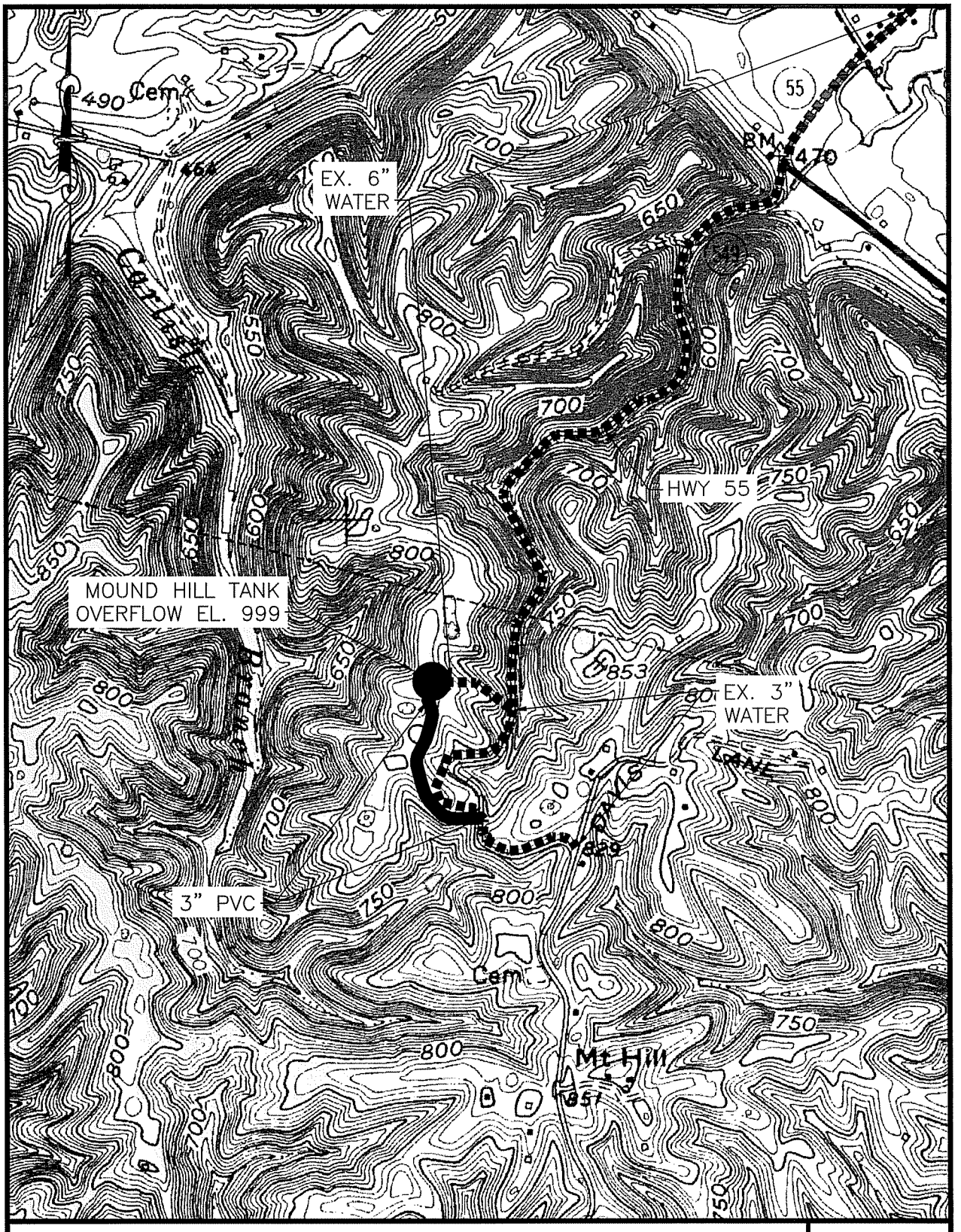
EXCEL
FLUID GROUP LLC

Kings Ridge



King's Ridge HGL - 40 GPM PUMP





LINE F
MOUND HILL WATERLINE EXTENSION
USGS QUAD MAP CARROLLTON
DISTRIBUTION SYSTEM IMPROVEMENTS
CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT
CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 6

5104.003

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MINIMUM PRESSURE CALCULATION FOR

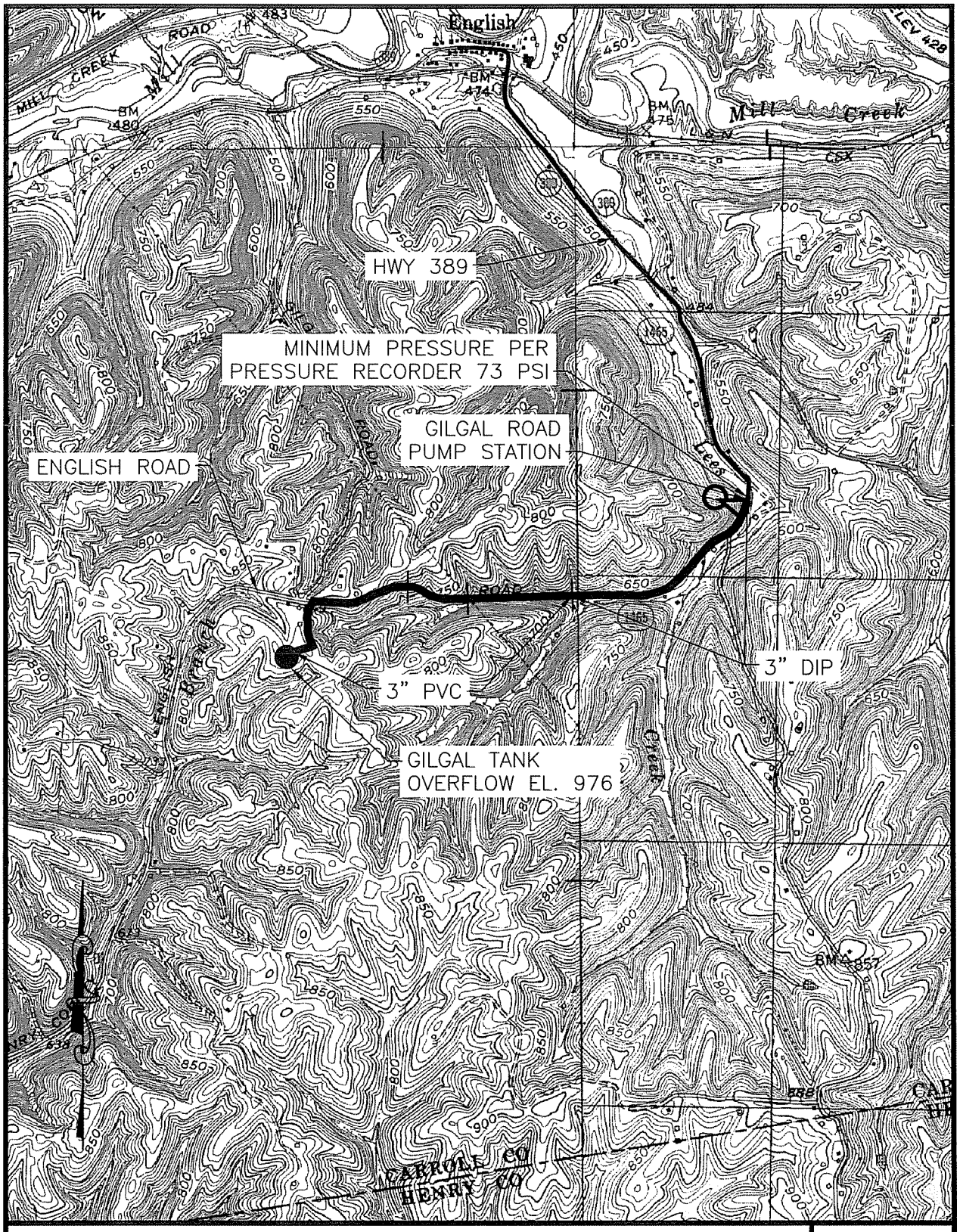
Mound Hill

# of Customers: 25
Flow (D.R. Taylor): 48 gpm
Supply Tank Overflow Elevation (ft): 989 ft
Peak Elevation (ft) for: 880 ft

Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									989.00	
Ex. 6" Line	250	250	6.0	28.3	140	0.24	0.06	0.06	988.94	0.54
New 3" Line	1,500	1,750	3.0	7.1	140	6.87	10.31	10.37	978.63	2.18
Cumulative		1,751								
Minimum Pressure (psi)	**43**									

= Enter data in shaded cells.

Mound Hill			
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data	
Water Elevation (ft) with Mound Hill Tank down 10 ft.		989.0	
Headloss (ft) from tank through looped sections		0	
High Point (ft)		900.0	880.0
Supply Main Data		Ex. 6" Line	Prop. 3" Line
Diameter (in)		6.0	3.0
Length (ft)		250	1,500
C Factor		140	140
Flow (gpm)		126	126
Headloss/1000'		1.4	40.8
Headloss (ft)		0.3	61.2
∑ Headloss (ft)		0.3	61.5
HGL @ High Point (ft)		988.7	927.5
Estimated Fireflow Data			
Static (ft)		89.0	109.0
Static (psi)		38.6	47.2
Residual (psi)		**20.0**	**20.0**
Residual (ft)		46.2	46.2
Residual Elevation (ft)		946.2	926.2
Head Differential (ft)		42.5	1.3
Flow (gpm)		**720**	**126**
Nozzle (in)		2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90
Velocity (ft/sec)		**1.4**	**5.7**



LINE G
GILGAL ROAD WATERLINE EXTENSION

USGS QUAD MAP CAMPBELLSBURG & WORTHVILLE
DISTRIBUTION SYSTEM IMPROVEMENTS
CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT
CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 7

5104.003

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Gilgal Pump Station - Based on Suction Side Minimum Pressure of 73 psi or 688 HGL

DISCHARGE SIDE

Flow **60** gpm

ELEV. GILGAL TANK 976 ft

Line	Length (ft)	CUMUL. Length (ft)	Pipe Size (in)	Area (sq in)	C	HL /1000'	HL (ft)	CUMUL. HL (ft)	H.G.L. (ft)	V (ft/s)
		42,800								
	7,000	49,800	0.0	0.0	140	10.39		0.00	688.00	#DIV/0!
	0	49,800	0.0	0.0	140					
Pump to Tank Prop. 4" Water Main	7,000	56,800	4.0	12.6	140	2.56	17.94	17.94	670.06	1.53
							17.94			
				Static Head			288.00			
							305.94			

SUCTION SIDE

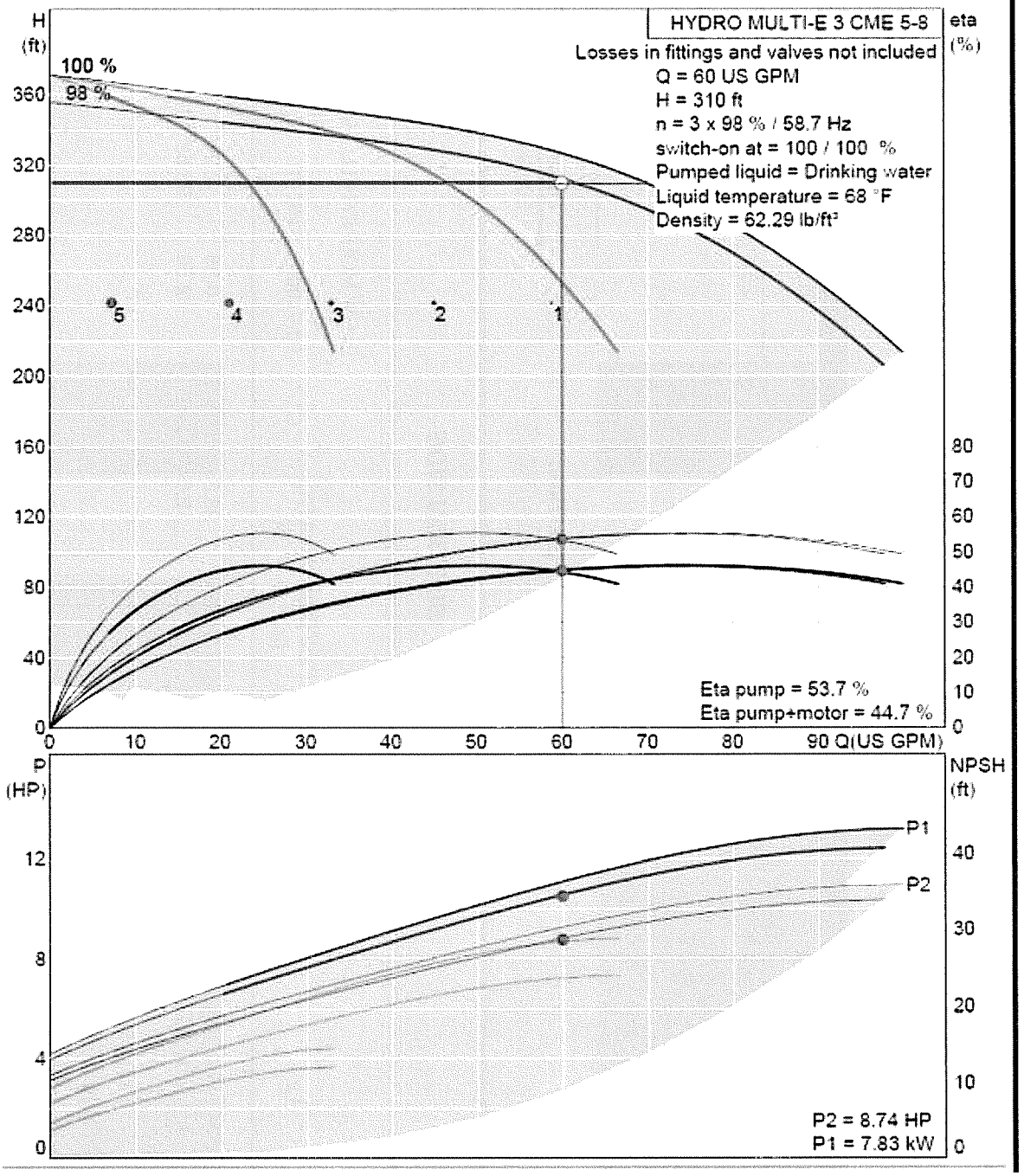
Flow **60** gpm

ELEV. MOUND HILL TANK 989 ft

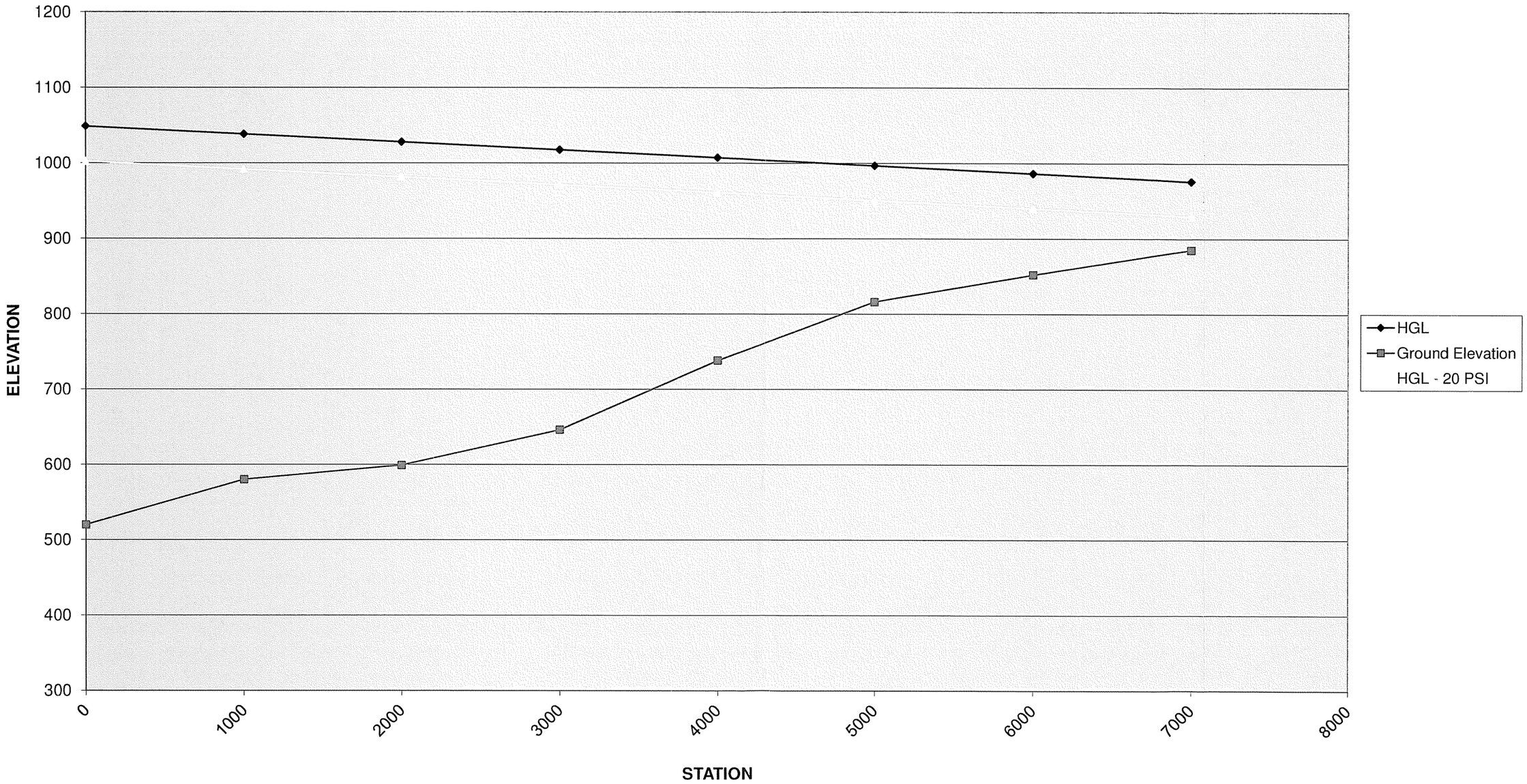
Line	Length (ft)	CUMUL. Length (ft)	Pipe Size (in)	Area (sq in)	C	HL /1000'	HL (ft)	CUMUL. HL (ft)	H.G.L. (ft)	V (ft/s)
Ex. 6" Water Main	6,300	6,300	6.0	28.3	140	0.36	2.24	2.24	986.76	0.68
Ex. 4" Water Main	36,500	42,800	4.0	12.6	140	2.56	93.52	95.77	893.23	1.53

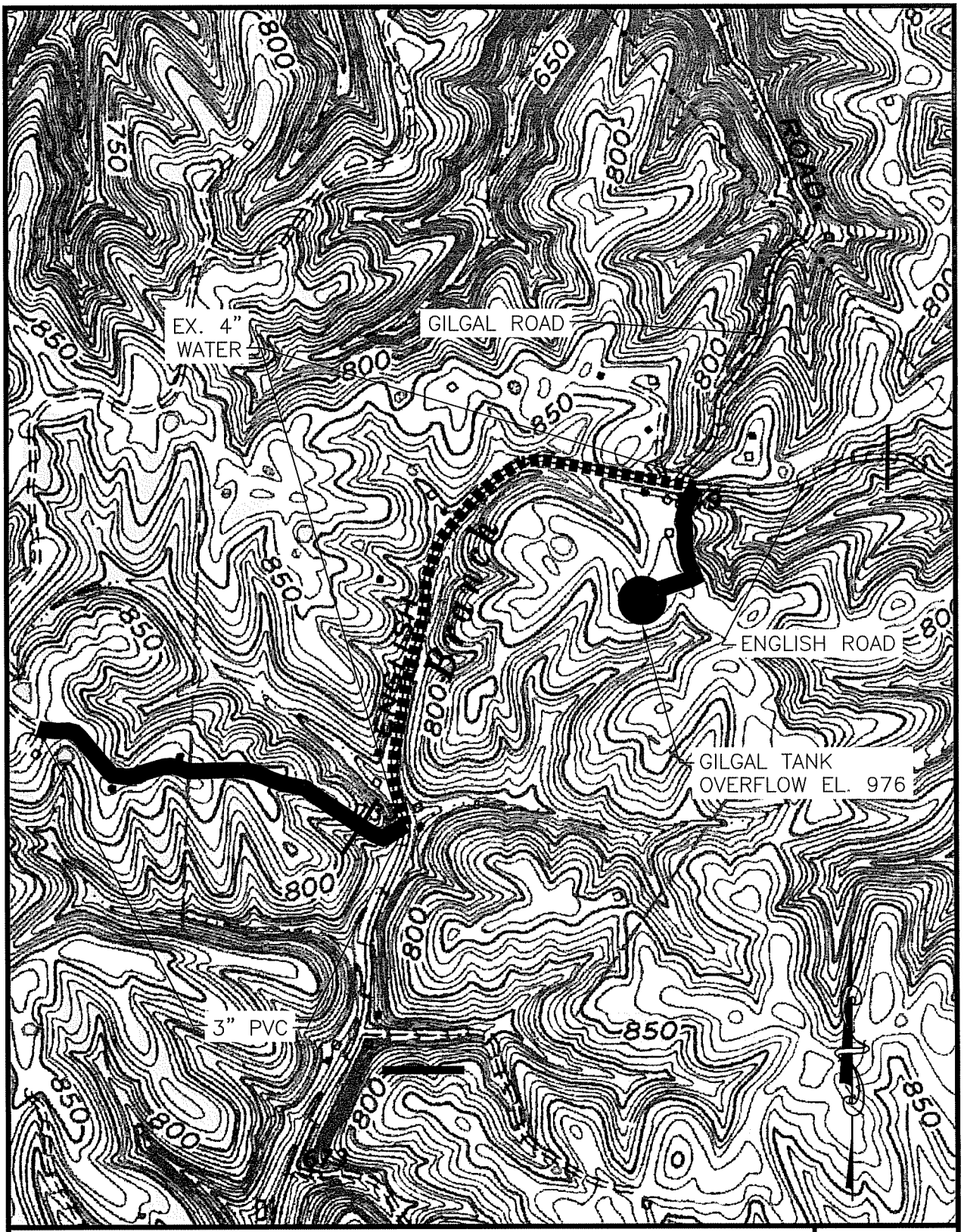
Excel Environmental Products
4548 Industrial Parkway
Cleveland, OH 44135
P: 216-941-1500 ❖ F: 216-941-9916
Toll Free: 800-892-2009
E-mail: sales@pescollc.com

91047452 HYDRO MULTI-E 3 CME 5-8 60 Hz



Gilgal HGL - 60 GPM PUMP





LINE H

NORA LANE WATERLINE EXTENSION

USGS QUAD MAP CAMPBELLSBURG & WORTHVILLE

DISTRIBUTION SYSTEM IMPROVEMENTS

CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT

CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 8

5104.003

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MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

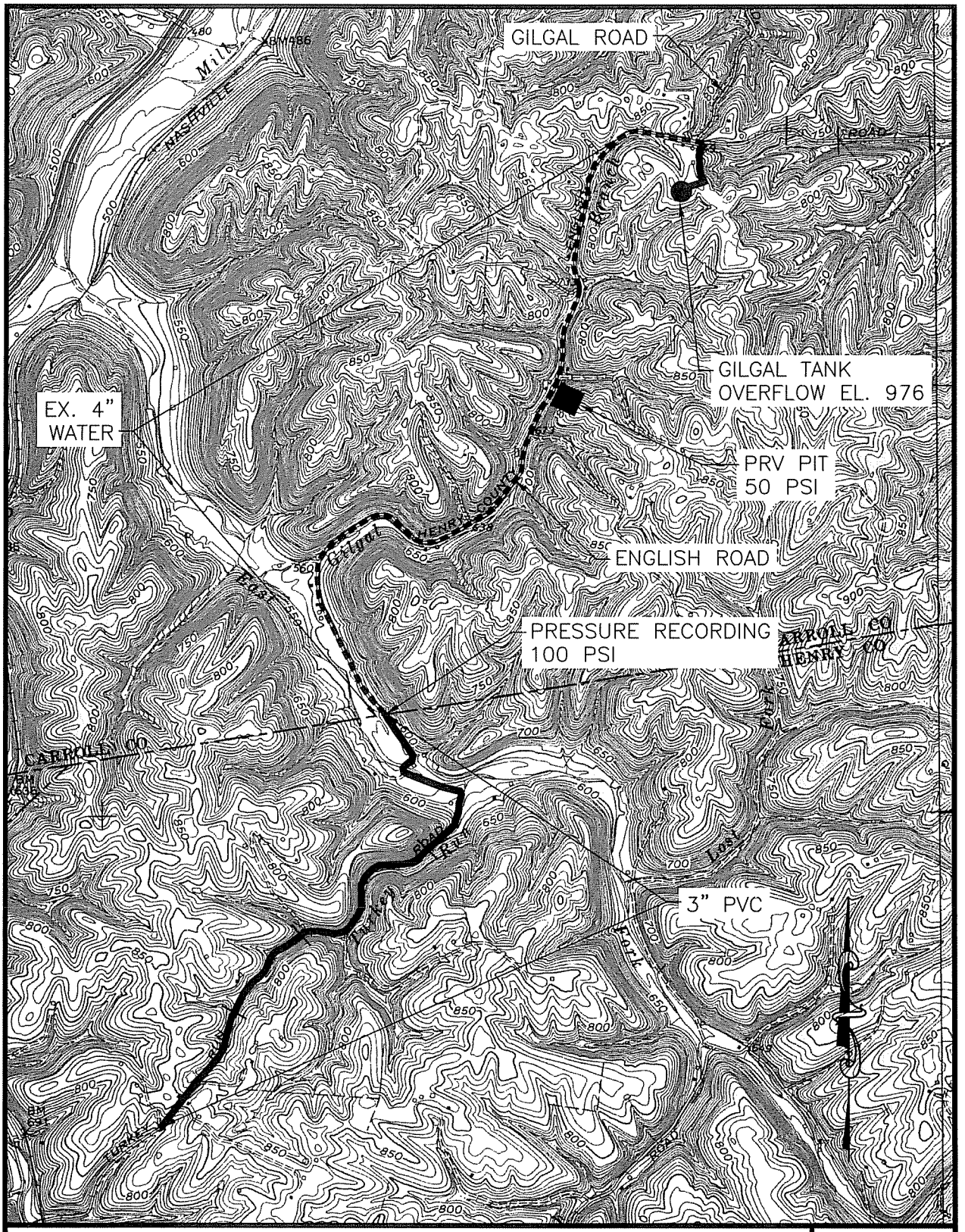
Nora Lane

# of Customers	6
Flow (D.R. Taylor)	25 gpm
Supply Tank Overflow Elevation (ft)	966 ft
Peak Elevation (ft) for New 3" Line	880 ft

Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									966.00	
New 4" Line	915	915	4.0	12.6	140	0.51	0.46	0.46	965.54	0.64
Ex. 3" Line	3,575	4,490	3.0	7.1	140	2.06	7.35	7.82	958.18	1.13
New 3" Line	2,550	7,040	3.0	7.1	140	2.06	5.24	13.06	952.94	1.13
Cumulative		7,040								
Minimum Pressure (psi)	**32**									

= Enter data in shaded cells.

Nora Lane				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Water Elevation (ft) with Gigal Tank down 10 ft.		966.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		880.0	850.0	880.0
Supply Main Data		New 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		915	3,575	2,550
C Factor		140	140	140
Flow (gpm)		46	46	46
Headloss/1000'		1.5	6.2	6.2
Headloss (ft)		1.4	22.3	15.9
∑ Headloss (ft)		1.4	23.7	39.7
HGL @ High Point (ft)		964.6	942.3	926.3
Estimated Fireflow Data				
Static (ft)		86.0	116.0	86.0
Static (psi)		37.3	50.3	37.3
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		926.2	896.2	926.2
Head Differential (ft)		38.4	46.1	0.2
Flow (gpm)		**685**	**750**	**46**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		**1.2**	**2.1**	**2.1**



LINE I

TURKEY RUN RD WATERLINE EXTENSION

USGS QUAD MAP CAMPBELLSBURG & WORTHVILLE

DISTRIBUTION SYSTEM IMPROVEMENTS

CARROLLTON UTILITIES & WEST CARROLL WATER DISTRICT

CARROLL, TRIMBLE, & HENRY COUNTIES, KENTUCKY

STRAND ASSOCIATES®

FIGURE 9

5104.003

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MINIMUM PRESSURE CALCULATION FOR **New 3" Line**

Turkey Run

									# of Customers	15
									Flow (D.R. Taylor)	37 gpm
									Gilgal Tank Assuming PRV Pit is Removed	966 ft
									Peak Elevation (ft) for New 3" Line	850 ft
Line	Length (ft)	Σ Length (ft)	Pipe Diameter (in)	Pipe Area (in^2)	C	HL/1000'	HL (ft)	Σ HL (ft)	H.G.L. (ft)	V (ft/s)
Supply Line									966.00	
New 4" Line	915	915	4.0	12.6	140	1.05	0.96	0.96	965.04	0.94
Ex. 3" Line	12,500	13,415	3.0	7.1	140	4.25	53.09	54.05	911.95	1.68
New 3" Line	10,950	24,365	3.0	7.1	140	4.25	46.51	100.56	865.44	1.68
Cumulative		24,365								
Minimum Pressure (psi)	**7**									

= Enter data in shaded cells.

Turkey Run				
Water Main Relocation Flushing Velocity Speadsheet		Pump Station & Flow Data		
Gilgal Tank - Assuming 10' low		966.0		
Headloss (ft) from tank through looped sections		0		
High Point (ft)		880.0	850.0	850.0
Supply Main Data		New 4" Line	Ex. 3" Line	New 3" Line
Diameter (in)		4.0	3.0	3.0
Length (ft)		915	12,500	10,950
C Factor		140	140	140
Flow (gpm)		30	30	30
Headloss/1000'		0.7	2.9	2.9
Headloss (ft)		0.7	36.8	32.3
∑ Headloss (ft)		0.7	37.5	69.8
HGL @ High Point (ft)		965.3	928.5	896.2
Estimated Fireflow Data				
Static (ft)		86.0	116.0	116.0
Static (psi)		37.3	50.3	50.3
Residual (psi)		**20.0**	**20.0**	**20.0**
Residual (ft)		46.2	46.2	46.2
Residual Elevation (ft)		926.2	896.2	896.2
Head Differential (ft)		39.2	32.3	0.1
Flow (gpm)		**691**	**628**	**30**
Nozzle (in)		2.5	2.5	2.5
Nozzle Discharge Coefficient		0.90	0.90	0.90
Velocity (ft/sec)		**0.8**	**1.4**	**1.4**

MAXIMUM DOMESTIC DEMAND (gpm)

# of Customers	Class of Property 1	2	3	4	Square Root Curve
0					
1	10	12	14	19	10
2	12	15	18	24	14
3	14	17	20	27	17
4	16	19	22	30	20
6	18	21	25	34	24
8	20	23	28	37	28
10	21	25	30	40	32
15	25	30	37	50	39
20	28	35	43	58	45
25	30	39	48	66	50
30	31	42	53	73	55
40	36	48	62	85	63
50	40	54	70	96	71
60	43	59	76	105	77
70	45	62	82	115	84
80	48	68	88	125	89
90	50	71	94	132	95
100	52	75	100	140	100
125	57	83	110	157	112
150	61	90	120	175	122
175	64	97	132	190	132
200	68	105	140	205	141
300	80	125	175	250	173
400	90	145	200	295	200
500	100	160	225	335	224

Note: Class of Property 3 & Square Root Curve Technique are approximately equal.

DESCRIPTION:

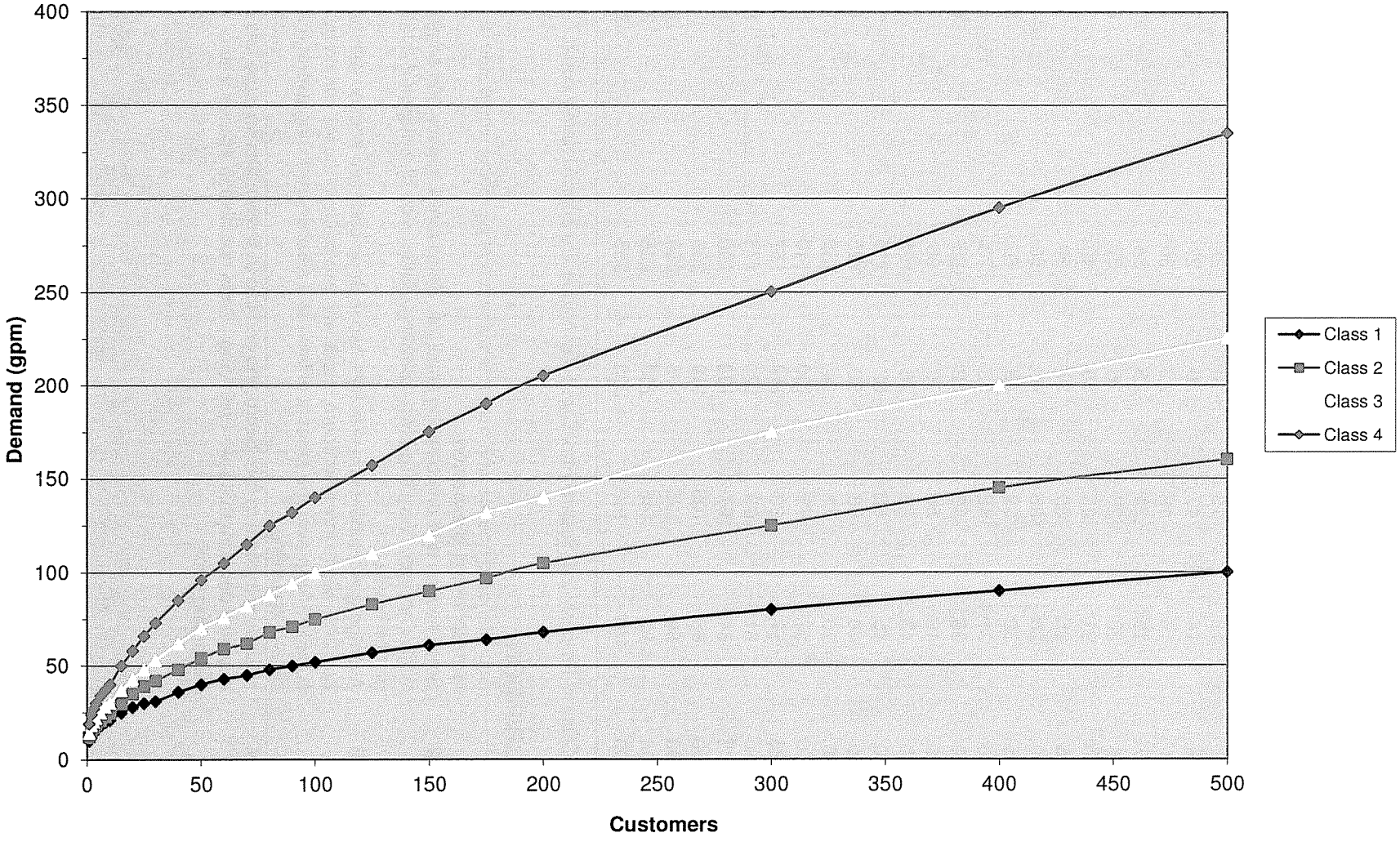
Class 1 — Sub-Standard houses with barest of minimum of plumbing where little or no lawn sprinkling is expected.

Class 2 — Small houses with one bath, on small lot. Small rental houses and small rental duplex houses. Very little lawn sprinkling. Either side of a duplex is considered as one house.

Class 3 — Average good subdivision with 80% two to three bedroom houses with one bath and 20% two to three bedroom huses with two baths. Houses owned by occupant, with average amount of lawn and shrubery requiring average amount of lawn sprinkling.

Class 4 — Houses with three to four bedrooms and two to three baths on large lots requiring considerable lawn sprinkling. Does not include estates with or without swimming pools.

Maximum Domestic Demand - D.R. Taylor Curve



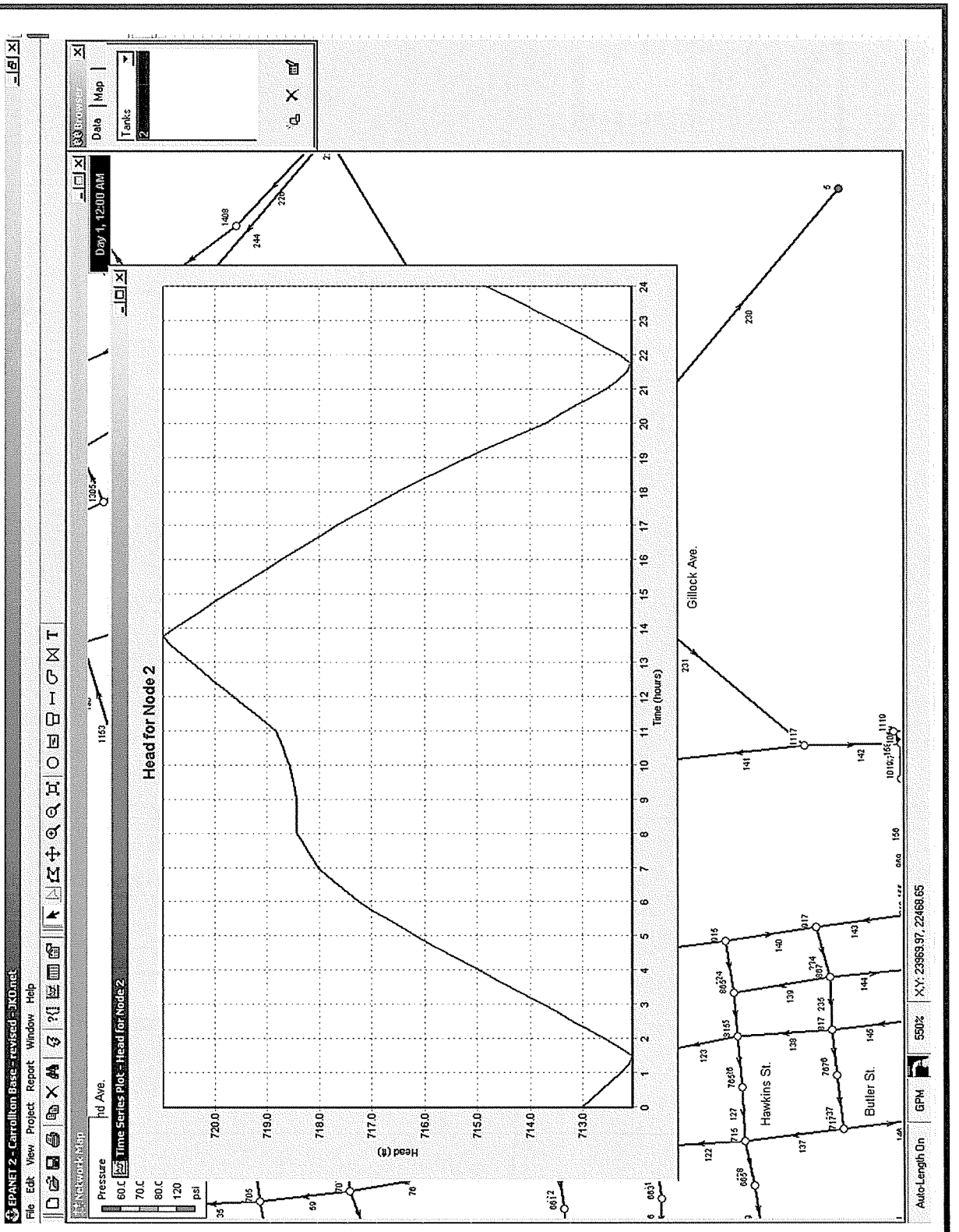
7/5/2012

APPENDIX C
ANALYSIS OF TRANSMISSION MAIN TO SERVE GENERAL BUTLER TANK

EXISTING SYSTEM PRESSURE WITH ONE HIGH SERVICE PUMP OPERATING
CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 1
5104.002



TANK 1 AND TANK 2 HGL FOR EXISTING SYSTEM WITH ONE HIGH SERVICE PUMP OPERATING
CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 2
5104.002

EXISTING SYSTEM PRESSURE WITH TWO HIGH SERVICE PUMPS OPERATING
CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 3
5104.002

TANK 1 AND TANK 2 HGL FOR EXISTING SYSTEM WITH TWO HIGH SERVICE PUMPS OPERATING
CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 4
5104.002

FUTURE SYSTEM PRESSURE WITH TWO HIGH SERVICE PUMPS OPERATING AND AN 8-IN. MAIN PARALLELING EXISTING 8-IN.
CARROLLTON UTILITIES COUNTYWIDE
UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

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FIGURE 5
5104.002

TANK 1 AND TANK 2 HGL WITH TWO HIGH SERVICE PUMPS OPERATING AND AN 8-INCH MAIN PARALLELING EXISTING 8-INCH

CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

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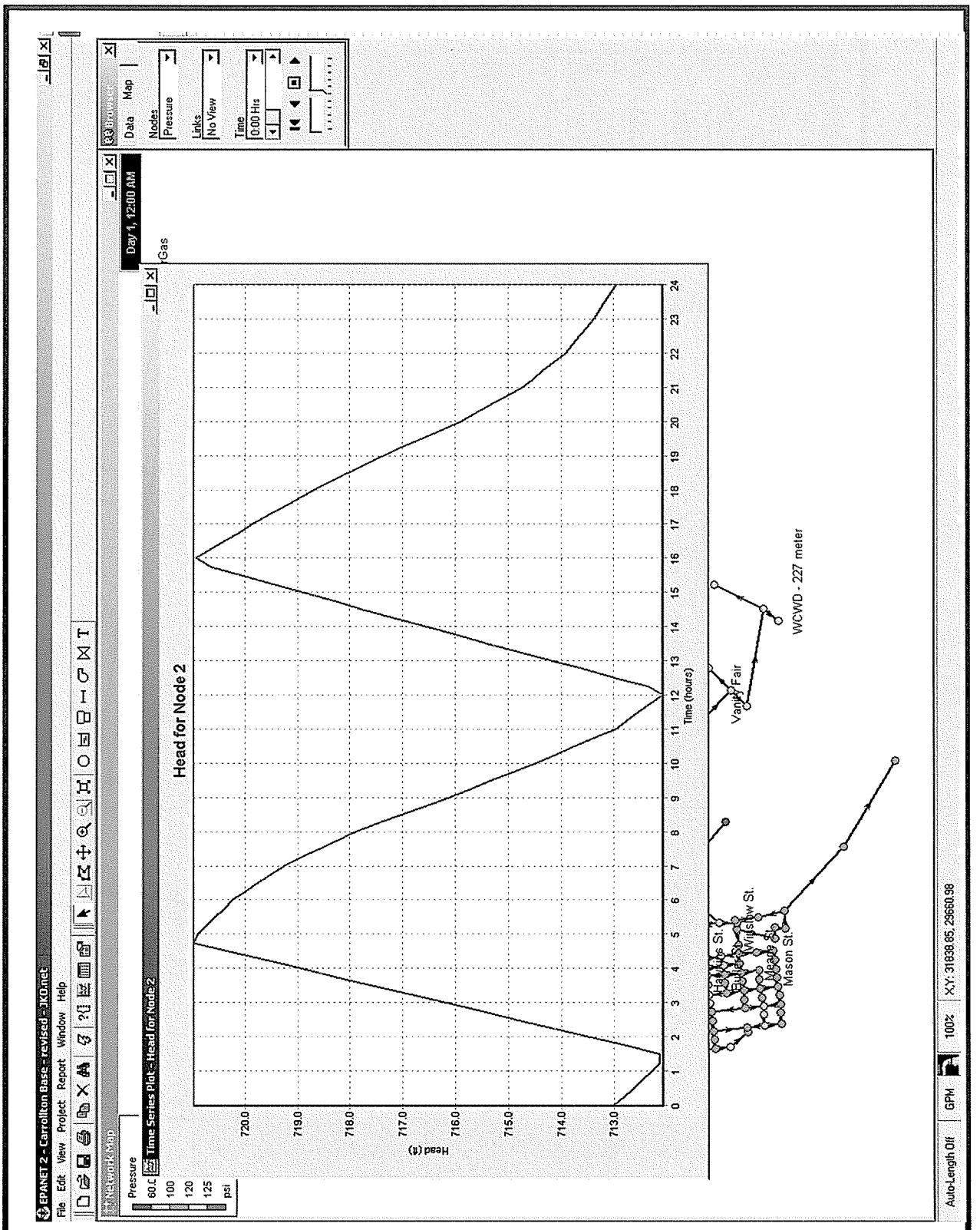
FIGURE 6
5104.002

FUTURE SYSTEM PRESSURE WITH TWO HIGH SERVICE PUMPS OPERATING AND A10-INCH MAIN PARALLELING EXISTING 8-INCH
CARROLLTON UTILITIES COUNTYWIDE
UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 7
5104.002



TANK 1 AND TANK 2 HGL WITH TWO HIGH SERVICE PUMPS OPERATING AND A 10-INCH MAIN PARALLELING EXISTING 8-INCH
CARROLLTON UTILITIES COUNTYWIDE
UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

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FIGURE 8
5104.002

FUTURE SYSTEM PRESSURE WITH TWO HIGH SERVICE PUMPS OPERATING AND A12-INCH MAIN PARALLELING EXISTING 8-INCH

CARROLLTON UTILITIES COUNTYWIDE UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

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FIGURE 9
5104.002

TANK 1 AND TANK 2 HGL WITH TWO HIGH SERVICE PUMPS OPERATING AND A 12-INCH MAIN PARALLELING EXISTING 8-INCH
CARROLLTON UTILITIES COUNTYWIDE
UNDERSERVED PROJECT
WEST CARROLL WATER DISTRICT
CARROLL COUNTY, KENTUCKY

STRAND ASSOCIATES®

FIGURE 10
5104.002

APPENDIX D
DISTRIBUTION SYSTEM IMPROVEMENTS COST OPINION

CONTRACT 1-2012 Proposed Distribution System Improvements	OWNER: Carrollton Utilities/ WCWD	ENGINEER: Strand Associates, Inc. 325 West Main Street Louisville, KY 40202

		BID / CHANGE ORDER			
NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL
LINE "A" PAINTERS RIDGE WATERLINE EXTENSION					
1	3 IN PVC Pipe, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	6,825	LF	$6.00	$40,950.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	2	EA	$1,500.00	$3,000.00
3	3 IN C.I. AWWA N.R.S. gate valve and box, CIP.	2	EA	$500.00	$1,000.00
4	3 IN blowoff hydrant for all size water mains, INCL gate valve, box, and all appurtenances, CIP, as per detail.	1	EA	$2,000.00	$2,000.00
5	Stream crossing with 8 IN PVC SDR 35 cover pipe and concrete cap, INCL furnishing, material, and labor.	80	LF	$50.00	$4,000.00
6	Special creek crossing meter box per details, INCL valve, meter, meter box, etc. and furnishing, material, and labor.	1	EA	$1,200.00	$1,200.00
7	Stream crossing with crushed stone, INCL furnishing, material, and labor.	70	LF	$40.00	$2,800.00
8	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
9	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
10	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
11	Cleanup and restoration, INCL furnishing, material, and labor.	6,825	LF	$1.00	$6,825.00
TOTAL LINE "A" PAINTERS RIDGE WATERLINE EXTENSION					$61,775.00
LINE "B" - KENDALL ROAD WATERLINE EXTENSION					
1	3 IN PVC Pipe, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	4,500	LF	$6.00	$27,000.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	1	EA	$1,500.00	$1,500.00
3	3 IN C.I. AWWA N.R.S. gate valve and box, CIP.	2	EA	$500.00	$1,000.00
4	3 IN blowoff hydrant for all size water mains, INCL gate valve, box, and all appurtenances, CIP, as per detail.	1	EA	$2,000.00	$2,000.00

		BID / CHANGE ORDER			
NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL
5	Crushed rock on trench surface at roadway crossings, streets, and driveways.	30	LF	$6.00	$180.00
6	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
7	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
8	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
9	Cleanup and restoration, INCL furnishing, material, and labor.	4,500	LF	$1.00	$4,500.00
TOTAL LINE "B" - KENDALL ROAD WATERLINE EXTENSION					$36,180.00
LINE "C" - MILLER'S BRANCH WATERLINE EXTENSION					
1	3 IN PVC Pipe, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	2,575	LF	$6.00	$15,450.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	1	EA	$1,500.00	$1,500.00
3	3 IN C.I. AWWA N.R.S. gate valve and box, CIP.	2	EA	$500.00	$1,000.00
4	3 IN blowoff hydrant for all size water mains, INCL gate valve, box, and all appurtenances, CIP, as per detail.	1	EA	$2,000.00	$2,000.00
5	Stream crossing with 8 IN PVC SDR 35 cover pipe and concrete cap, INCL furnishing, material, and labor.	75	LF	$50.00	$3,750.00
6	Special creek crossing meter box per details, INCL valve, meter, meter box, etc. and furnishing, material, and labor.	2	EA	$1,200.00	$2,400.00
7	Stream crossing with crushed stone, INCL furnishing, material, and labor.	35	LF	$40.00	$1,400.00
8	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
9	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
10	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
11	Cleanup and restoration, INCL furnishing, material, and labor.	2,575	LF	$1.00	$2,575.00

		BID / CHANGE ORDER			
NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL
TOTAL LINE "C" - MILLER'S BRANCH WATERLINE EXTENSION					$30,075.00
LINE "D" - HARDY CREEK WATERLINE EXTENSION					
1	3 IN PVC Pipe, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	2,800	LF	$6.00	$16,800.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	1	EA	$1,500.00	$1,500.00
3	3 IN C.I. AWWA N.R.S. gate valve and box, CIP.	1	EA	$500.00	$500.00
4	3 IN blowoff hydrant for all size water mains, INCL gate valve, box, and all appurtenances, CIP, as per detail.	1	EA	$2,000.00	$2,000.00
5	Stream crossing with 8 IN PVC SDR 35 cover pipe and concrete cap, INCL furnishing, material, and labor.	130	LF	$50.00	$6,500.00
6	Special creek crossing meter box per details, INCL valve, meter, meter box, etc. and furnishing, material, and labor.	2	EA	$1,200.00	$2,400.00
7	8 IN steel cover pipe, furnishing and installing, trenching under state maintained roads, INCL unclassified boring and/or jacking (water pipe not included).	30	LF	$90.00	$2,700.00
8	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
9	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
10	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
11	Cleanup and restoration, INCL furnishing, material, and labor.	2,800	LF	$1.00	$2,800.00
TOTAL LINE "D" - HARDY CREEK WATERLINE EXTENSION					$35,200.00
LINE "E" - US 42/KY 36 WATER MAIN EXTENSION					
1	6 IN PVC Pipe furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	9,600	LF	$10.00	$96,000.00
2	6 DIP PVC Pipe furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	2,000	LF	$20.00	$40,000.00
3	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	2	EA	$2,000.00	$4,000.00
4	6 IN C.I. AWWA N.R.S. gate valve and box, CIP.	6	EA	$1,000.00	$6,000.00

NO.	ITEM	BID / CHANGE ORDER QTY	UNIT	UNIT COST	TOTAL
5	Stream crossing with 12 IN PVC SDR 35 cover pipe and concrete cap, INCL furnishing, material, and labor.	90	LF	$75.00	$6,750.00
6	Special creek crossing meter box per details, INCL valve, meter, meter box, etc. and furnishing, material, and labor.	3	EA	$1,300.00	$3,900.00
7	12 IN steel cover pipe, furnishing and installing, trenching under state maintained roads, INCL unclassified boring and/or jacking (water pipe not included).	150	LF	$150.00	$22,500.00
8	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
9	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
10	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
11	Cleanup and restoration, INCL furnishing, material, and labor.	9,600	LF	$1.00	$9,600.00
12	Stream crossing with 16" PE Directional Drill and 6" PE Water main, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	300	LF	$175.00	$52,500.00
13	Automatic air release valve assembly and box, CIP, as per detail.	1	EA	$1,200.00	$1,200.00
TOTAL LINE "E" - US 42/KY 36 WATER MAIN EXTENSION					$242,450.00
LINE "F" - MOUND HILL WATERLINE EXTENSION					
1	3 IN PVC Pipe furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	1,500	LF	$6.00	$9,000.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	2	EA	$1,500.00	$3,000.00
3	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
4	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
5	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		LF	$10.00	
6	Crushed rock on trench surface at roadway crossings, streets, and driveways.	30	LF	$6.00	$180.00
7	Cleanup and restoration, INCL furnishing, material, and labor.	1,500	LF	$1.00	$1,500.00

NO.	ITEM	BID / CHANGE ORDER QTY	UNIT	UNIT COST	TOTAL
TOTAL LINE "F" - MOUND HILL WATERLINE EXTENSION					$13,680.00
LINE "G" - GILGAL ROAD WATER MAIN REPLACEMENT					
1	4 IN DIP furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	6,000	LF	$20.00	$120,000.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	1	EA	$1,500.00	$1,500.00
3	4 IN C.I. AWWA N.R.S. gate valve and box, CIP.	2	EA	$550.00	$1,100.00
4	10 IN steel cover pipe, furnishing and installing, trenching under state maintained roads, INCL unclassified boring and/or jacking (water pipe not included).	30	LF	$95.00	$2,850.00
5	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$1,200.00	
6	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		LF	$800.00	
7	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.	300	EA	$10.00	$3,000.00
8	Cleanup and restoration, INCL furnishing, material, and labor.	6,000	EA	$1.00	$6,000.00
9	Stream crossing with crushed stone, INCL furnishing, material, and labor.	65	LF	$40.00	$2,600.00
TOTAL LINE "G" - GILGAL ROAD WATER MAIN REPLACEMENT					$137,050.00
LINE "H" - NORA LANE WATERLINE EXTENSION					
1	3 IN PVC, furnishing, trenching, laying and backfilling. INCL all associated tees, reducers, and bends (unclassified excavation).	2,550	LF	$6.00	$15,300.00
2	Tie-in to existing water mains, INCL tapping saddle, tapping gate valve, etc. furnishing and installation, INCL unclassified excavation.	1	EA	$1,500.00	$1,500.00
3	3 IN blowoff hydrant for all size water mains, INCL gate valve, box, and all appurtenances, CIP, as per detail.	1	EA	$2,000.00	$2,000.00
4	3 IN C.I. AWWA N.R.S. gate valve and box, CIP.	1	LF	$500.00	$500.00
5	8 IN steel cover pipe, furnishing and installing, trenching under state maintained roads, INCL unclassified boring and/or jacking (water pipe not included).	50	LF	$90.00	$4,500.00
6	Customer services opposite side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		LF	$1,200.00	

NO.	ITEM	BID / CHANGE ORDER QTY	UNIT	UNIT COST	TOTAL
7	Customer services same side of road as main with tandem meter setter and individual pressure reducing valve, CIP, as per detail.		EA	$800.00	
8	Additional 3/4 IN service pipe, furnishing, trenching, laying and backfilling where required in addition to Items 5 & 6.		EA	$10.00	
9	Cleanup and restoration, INCL furnishing, material, and labor.	2,550	EA	$1.00	$2,550.00
TOTAL LINE "H" - NORA LANE WATERLINE EXTENSION					$26,350.00
TOTAL ALL LINES					$582,760.00
Kings Ridge Road Booster Pump Station					
1	Pump station includes furnishing, trenching, laying, building, foundation, telemetry system, electrical, all taps into existing mains, line work, and backfilling, including all associated tees, reducers, and bends. (Unclassified excavation)	1	EA	$95,000.00	$95,000.00
TOTAL -Kings Ridge Road Booster Pump Station					$95,000.00
Gilgal Road Booster Pump Station					
1	Pump station includes furnishing, trenching, laying, building, foundation, telemetry system, electrical, all taps into existing mains, line work, and backfilling, including all associated tees, reducers, and bends. (Unclassified excavation)	1	EA	$85,000.00	$85,000.00
TOTAL -Gilgal Road Booster Pump Station					$85,000.00
TOTAL ALL BOOSTER PUMP STATIONS					$180,000.00
PROJECT CONTINGENCIES					$76,276.00
TOTAL PROJECT COST OPINION					**$839,036.00**